EPA/ROD/R02-85/019
1985

EPA Superfund
Record of Decision:

GEMS LANDFILL
EPA ID: NJD980529192
OU 01
GLOUCESTER TOWNSHIP, NJ
09/27/1985

- REMEDIAL INVESTIGATION AND FEASIBILITY STUDY, GEMS LANDFILL SITE, NUS CORPORATION, JULY 1985

- FOCUSED FEASIBILITY STUDY REPORT, GEMS LANDFILL SITE, NUS CORPORATION, APRIL 1985

- CONCEPTUAL DESIGN REPORT FOR INTERIM REMEDIAL SYSTEM, GEMS LANDFILL, MALCOLM PIRNIE, INC., APRIL 1985

- PHASES I-III REPORT, TREATABILITY STUDY TO MEET OBJECTIVE I FOR GEMS LANDFILL LEACHATE, PRINCETON AQUA SCIENCE, FEBRUARY 1985

- STAFF SUMMARIES AND RECOMMENDATIONS FOR REMEDIAL ALTERNATIVE SELECTION

- RESPONSIVENESS SUMMARY FOR THE GEMS SITE, SEPTEMBER 1985.

#DE
DECLARATIONS

CONSISTENT WITH THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (CERCLA), AND THE NATIONAL OIL AND HAZARDOUS SUBSTANCES CONTINGENCY PLAN (NCP), 40 CFR PART 300, AND PURSUANT TO EPA DELEGATION MANUAL ORDER 14-5, I HAVE DETERMINED THAT THE REMEDY DESCRIBED ABOVE IS THE COST-EFFECTIVE REMEDIAL ACTION ALTERNATIVE FOR THE GEMS LANDFILL SITE.

IT IS HEREBY DETERMINED THAT IMPLEMENTATION OF THIS REMEDIAL ACTION IS THE LOWEST COST ALTERNATIVE THAT IS TECHNOLOGICALLY FEASIBLE AND RELIABLE, AND WHICH EFFECTIVELY MITIGATES AND MINIMIZES DAMAGES TO AND PROVIDES ADEQUATE PROTECTION OF PUBLIC HEALTH, WELFARE AND THE ENVIRONMENT. IT IS ALSO DETERMINED THAT THE STATE OF NEW JERSEY'S PROPOSED REMEDIAL ACTION FOR HOLLY RUN BEHIND THE FOX CHASE II DEVELOPMENT, TO COLLECT AND PRETREAT THE GROUND WATER/LEACHATE AND TO RELOCATE A PORTION OF HOLLY RUN IS TECHNICALLY EQUIVALENT AND COMPARABLE IN COST WITH THE RECOMMENDED IRM, AND CONSISTENT WITH THE SELECTED REMEDY. THE SELECTED REMEDY IS ALSO DETERMINED TO BE APPROPRIATE WHEN BALANCED AGAINST THE AVAILABILITY OF TRUST FUND MONIES FOR USE AT OTHER SITES.

THE STATE OF NEW JERSEY HAS BEEN CONSULTED AND AGREES WITH THE SELECTED REMEDY.

SEPTEMBER 27, 1985 CHRISTOPHER J. DAGGETT
DATE REGIONAL ADMINISTRATOR.

GLOUCESTER ENVIRONMENTAL MANAGEMENT SERVICES LANDFILL SUMMARY OF REMEDIAL ALTERNATIVE EVALUATION

#SLD
SITE LOCATION AND DESCRIPTION

THE GEMS LANDFILL SITE IS LOCATED IN GLOUCESTER TOWNSHIP, CAMDEN COUNTY, NEW JERSEY, AT THE INTERSECTION OF BLACKWOOD/NEW BROOKLYN ROAD (ERIAL ROAD) AND TURNERSVILLE-HICKSTOWN ROAD. THE SITE IS SITUATED ON TAX MAP BLOCK 14003, LOT 26, WITH GEOGRAPHICAL COORDINATES 39 DEGREES 46 MINUTES 48 SECONDS NORTH AND 75 DEGREES 01 MINUTES 15 SECONDS WEST. THE LOCATION OF THE LANDFILL IS SHOWN IN FIGURE 1-1. THE SITE COVERS APPROXIMATELY 60 ACRES IN A TRIANGULAR PLAN, WITH A VERTICAL RELIEF OF APPROXIMATELY 100 FEET ABOVE THE SURROUNDING TOPOGRAPHY. THE VOLUME OF THE LANDFILL IS ESTIMATED TO BE 6 MILLION CUBIC YARDS.

HOLLY RUN IS A SMALL STREAM THAT ORIGINATES NEAR THE SOUTHEAST CORNER OF THE LANDFILL AND FLOWS NORTHWARD ALONG THE NORTHEAST SIDE OF THE PROPERTY AS SHOWN IN FIGURE 1-2. NEAR ITS ORIGIN AND ADJACENT TO THE LANDFILL, HOLLY RUN WAS RELOCATED TO ALLOW FOR DEVELOPMENT OF THE LAND. AS A RESULT, A SWAMPY AREA HAS DEVELOPED IN THE FORMER STREAMBED. FLOWING PAST THE NORTHWEST CORNER OF THE LANDFILL, HOLLY RUN MAINTAINS ITS NORTHWESTERLY DIRECTION. IT FLOWS INTO BRIAR LAKE WHICH IS A QUARTER MILE AWAY FROM THE SITE. FROM BRIAR LAKE, HOLLY RUN FLOWS TO HOLLY LAKE, THREE QUARTERS OF A MILE FROM THE LANDFILL, AND ON TO THE SOUTH BRANCH OF TIMBER CREEK.

THE AREA SURROUNDING THE GEMS LANDFILL IS RURAL AND PREDOMINANTLY RESIDENTIAL. HOWEVER, SOME OF THE LAND

ADJACENT TO THE SITE IS USED FOR INDUSTRIAL AND RECREATIONAL PURPOSES. THE CLOSEST HOMES TO THE LANDFILL ARE IN THE FOX CHASE II DEVELOPMENT ALONG THE NORTHEAST SIDE, APPROXIMATELY 300-500 FEET FROM THE TOE OF THE LANDFILL. THE HOMES IN THE BRIAR LAKE AREA ARE ABOUT 1,000 FEET NORTHWEST OF THE SITE. BOTH THE FOX CHASE II HOMES AND THE BRIAR LAKE HOMES ARE SEPARATED FROM THE LANDFILL BY HOLLY RUN (FIGURE 1-2). ANOTHER GROUP OF HOMES IS LOCATED 1,000 FEET SOUTH OF THE LANDFILL ACROSS TURNERSVILLE-HICKSTOWN ROAD. A CEMENT MANUFACTURING AND WELDING OPERATION IS LOCATED ACROSS THE ROAD ABOUT 300 FEET FROM THE SITE. A MOTORBIKE COURSE IS MAINTAINED JUST WEST OF THE LANDFILL.

#SH
SITE HISTORY

GLOUCESTER TOWNSHIP HAS OWNED THE GEMS SITE FOR THE ENTIRE PERIOD EXTENDING FROM THE LATE 1950'S UP TO THE PRESENT. DURING THIS TIME PERIOD THE GEMS LANDFILL HAS BEEN OPERATED BY VARIOUS PARTIES AS A DISPOSAL SITE FOR SOLID, LIQUID AND HAZARDOUS WASTES AND HAZARDOUS SUBSTANCES. ORIGINALLY, THE TOWNSHIP WAS RESPONSIBLE FOR OPERATING A SMALL PORTION OF THE LANDFILL. IN 1969, THE TOWNSHIP CONTRACTED ANTHONY AMADEI TO OPERATE THE LANDFILL. ANTHONY AMADEI CREATED THE ANTHONY AMADEI SAND AND GRAVEL COMPANY IN 1970 WHICH CONTINUED TO OPERATE THE SITE. IN 1976, GLOUCESTER ENVIRONMENTAL MANAGEMENT SERVICES, INC. (GEMS), STARTED TO OPERATE THE SITE AND CONTINUED SUCH OPERATIONS UNTIL THE SITE WAS CLOSED IN NOVEMBER 1980.

THE ENVIRONMENTAL PHOTOGRAPHIC INTERPRETATION CENTER (EPIC) OF THE ENVIRONMENTAL MONITORING SYSTEMS LABORATORY (EPA'S OFFICE OF RESEARCH AND DEVELOPMENT) HAS COMPILED A HISTORICAL ANALYSIS BASED ON AERIAL PHOTOGRAPHS TAKEN WHILE THE LANDFILL WAS ACTIVE. FIGURE 1-3 SHOWS AERIAL DEVELOPMENT OF THE LANDFILL WITH TIME. AN AERIAL PHOTOGRAPH TAKEN IN 1957 SHOWS A SMALL AREA OF SCARRED GROUND IN THE SOUTHEAST CORNER OF THE PLOT THAT WOULD LATER BECOME THE LANDFILL. A PHOTOGRAPH TAKEN JUNE 25, 1963 SHOWS 11.4 ACRES OF LANDFILL OPERATIONS. THE APRIL 4, 1965 PHOTOGRAPH SHOWS A 16 ACRE AREA OF THE LANDFILL OPERATION WHICH MAY INCLUDE DITCHES AND TRENCHES. BY SEPTEMBER 12, 1970, THE OPERATION HAD EXPANDED TO COVER 39.5 ACRES. THE PHOTOGRAPH ALSO SHOWS EVIDENCE OF POSSIBLE OPEN LIQUID DISPOSAL. AT THAT TIME, SAND AND GRAVEL MAY HAVE BEEN EXTRACTED AFTER THE LAND WAS CLEARED AND THE PIT BACKFILLED WITH WASTE. AS SHOWN IN THE PHOTOGRAPH TAKEN APRIL 7, 1974, THE LANDFILL OPERATION OCCUPIED 61.7 ACRES. DRUMS, TANKS, AND TRASH TRUCKS WERE ALL VISIBLE.

RECORDS INDICATE THAT CHEMICAL WASTES MAY HAVE BEEN DISPOSED AT THE SITE BENEATH THE WATER TABLE PRIOR TO 1970. DISPOSAL OF CHEMICAL WASTES OCCURRED AT THE SITE FOR A PERIOD OF APPROXIMATELY THREE WEEKS IN 1970. NJDEP INSPECTIONS AND OTHER EVIDENCE INDICATE THAT CHEMICALS MAY HAVE ALSO BEEN DUMPED AT THE SITE BETWEEN 1970 AND 1976. THE NJDEP SOLID WASTE ADMINISTRATION (SWA) CONDUCTED REGULAR INSPECTIONS OF THE GEMS LANDFILL BEGINNING IN APRIL, 1973. THESE INSPECTIONS OFTEN REVEALED DEFICIENCIES IN SANITARY LANDFILL OPERATING PROCEDURES, SUCH AS USE OF INADEQUATE OR INSUFFICIENT COVER MATERIAL AND FAILURE TO CONTROL WINDBLOWN PAPER. OVER 60 SEPARATE INSPECTION REPORTS INDICATE LEACHATE EMANATING FROM THE LANDFILL AND FLOWING INTO HOLLY RUN. RECORDS INDICATE THAT A VARIETY OF INDUSTRIAL WASTE INCLUDING ASBESTOS, SOLVENTS AND OTHER MATERIALS WERE DISPOSED OF AT THE GEMS SITE BETWEEN 1970 AND 1979.

IN APRIL, 1977, A LAND SURVEY BY SWA INDICATED THAT GEMS LANDFILL HAD EXCEEDED ITS APPROVED DESIGN SPECIFICATIONS. GEMS DISPUTED THAT THE LANDFILL HAD REACHED CAPACITY, BUT SUPPLIED NO EVIDENCE TO NJDEP IN SUPPORT OF ITS POSITION. A DESIGN FOR EXPANSION SUBMITTED AT THE END OF 1976 WAS NOT APPROVED BECAUSE THE ENVIRONMENTAL IMPACT STATEMENT REQUIRED FOR THE EXPANSION HAD NOT BEEN CONDUCTED. CONSEQUENTLY, SWA ISSUED AN ADMINISTRATIVE ORDER ON SEPTEMBER 1, 1977, REQUIRING THE LANDFILL TO CEASE OPERATION WITHIN 10 DAYS, HOWEVER, THE SITE WAS SUBSEQUENTLY ALLOWED TO CONTINUE OPERATIONS UNTIL NOVEMBER 1980.

IN 1980, SLUDGE FROM THE CITY OF PHILADELPHIA NORTHEAST WASTEWATER TREATMENT FACILITY WAS DISPOSED OF AT THE GEMS SITE. ANALYSES OF THIS SLUDGE BY DEP REVEALED THE PRESENCE OF DICHLORODIPHENYL DICHLOROETHANE (DDD), A DEGRADATION BY-PRODUCT OF THE PESTICIDE DICHLORODIPHENYL TRICHLOROETHANE (DDT) AMONG OTHER CONSTITUENTS.

STUDIES UNDERTAKEN BY NEW JERSEY STATE, CAMDEN COUNTY, AND EPA AMONG OTHERS HAVE DOCUMENTED THE FACT THAT HAZARDOUS SUBSTANCES HAVE BEEN DISPOSED AT THE GEMS SITE IN THE PAST, THAT HAZARDOUS SUBSTANCES EXIST AT PRESENT AT THE GEMS SITE AND THAT HAZARDOUS SUBSTANCES HAVE CONTINUED TO BE RELEASED FROM THE SITE IN THE FORM OF GROUNDWATER, LEACHATE, SURFACE RUNOFF, AND AIRBORNE CONTAMINANTS.

IN JANUARY OF 1980, THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION (NJDEP) BEGAN TESTING PRIVATE WATER

WELLS IN THE AREA FOR VOLATILE ORGANIC CHEMICALS. IN JUNE, 1980, NJDEP EXPANDED ITS TESTING TO INCLUDE SURFACE WATER AND FOUND LEACHATE CONTAMINATION IN HOLLY RUN AND BRIAR LAKE. EIGHTEEN MONITORING WELLS WERE INSTALLED AT THE SITE IN OCTOBER 1981. SINCE THEN, ADDITIONAL MONITORING OF BOTH GROUND WATER AND SURFACE WATER HAS BEEN CONDUCTED PERIODICALLY BY BOTH NJDEP AND CAMDEN COUNTY, INCLUDING SCANS FOR PRIORITY POLLUTANTS.

IN APRIL AND DECEMBER OF 1982, THE NEW JERSEY DEPARTMENT OF HEALTH (NJDOH) AND THE CAMDEN COUNTY HEALTH DEPARTMENT CONDUCTED A HEALTH SURVEY FOR THE POPULATION LIVING NEAR THE GEMS LANDFILL SITE. INCREASED MINOR RESPIRATORY PROBLEMS HAD BEEN REPORTED BY THOSE LIVING NEAR THE LANDFILL. PULMONARY FUNCTION TESTS WERE CONDUCTED TO VERIFY THE RESULTS OF THE SURVEY. HOWEVER, THERE WAS NO SIGNIFICANT DIFFERENCE IN THE PERCENTAGE OF ABNORMAL PULMONARY FUNCTIONS BETWEEN THOSE WHO WERE EXPOSED TO THE GEMS LANDFILL AND THOSE WHO WERE NOT EXPOSED.

IN FEBRUARY OF 1983, EPA AND NJDEP AGREED TO INITIATE WORK IN THE AREA OF HOLLY RUN AND THE FOX CHASE II HOMES OFF BLACKWOOD/NEW BROOKLYN ROAD. THE CONTAMINATION IN HOLLY RUN WAS DETERMINED BY NJDOH TO PRESENT A DIRECT CONTACT TO HAZARD TO THE PUBLIC. AMBIENT AIR READINGS OF TOTAL ORGANICS NEAR HOLLY RUN INDICATED A POTENTIAL HAZARD TO PERSONS ENTERING THE AREA. CHILDREN WERE OBSERVED PLAYING IN THE AREA BEHIND FOX CHASE II. ALSO, BECAUSE OF INADEQUATE SIZING OF THE CULVERTS AT THE INLET TO BRIAR LAKE, FLOODING OF RESIDENTIAL PROPERTIES WAS OCCURRING IN THE BRIAR LAKE DEVELOPMENT BY HOLLY RUN. THIS FLOODING INCREASED THE LIKELIHOOD OF CONTACT WITH THE CONTAMINANTS IN HOLLY RUN. SEVERAL ACTIONS WERE TAKEN TO REDUCE THESE HAZARDS. A SAND BERM WAS INSTALLED TO RESTRICT THE SURFACE WATER FROM FLOWING INTO FOX CHASE II. FENCES WERE INSTALLED ALONG HOLLY RUN AND AROUND BRIAR LAKE TO RESTRICT ACCESS TO THE LANDFILL AND TO THE SURFACE WATERS. IN ADDITION, THE TWO CULVERTS AT THE INLET OF BRIAR LAKE WERE REPLACED TO CONTROL FLOODING UPSTREAM.

IN MARCH OF 1983, EPA AND NJDEP AGREED TO DEVELOP AND EVALUATE ALTERNATIVES TO DEWATER THE AREA BETWEEN FOX CHASE II AND THE LANDFILL. EPA PERFORMED STUDIES TO DETERMINE THE GEOLOGIC CHARACTERISTICS AT THE SITE, DETERMINE THE DIRECTION AND RATE OF GROUND WATER FLOW, ASSESS THE EXTENT OF GROUND WATER CONTAMINATION, AND EVALUATE THE EFFECT OF PUMPING ON EXISTING GROUND WATER FLOW PATTERNS WHICH WOULD DETERMINE THE FEASIBILITY OF PERMANENTLY LOWERING THE WATER TABLE. LOWERING THE WATER TABLE WOULD PREVENT THE LEACHATE FROM SURFACING BEHIND THE HOMES IN FOX CHASE II. THE STUDY WAS COMPLETED IN NOVEMBER, 1984 AND THE RESULTS WERE USED FOR THE FOCUSED FEASIBILITY STUDY (FFS) PREPARED BY NUS CORP. THE FFS WAS COMPLETED IN APRIL, 1985.

#ENF
ENFORCEMENT STATUS

AS OF THIS DATE, EPA HAS IDENTIFIED THE FOLLOWING POTENTIALLY RESPONSIBLE PARTIES (PRPS) FOR THE GEMS SITE: GLOUCESTER ENVIRONMENTAL MANAGEMENT SERVICES, INC. (GEMS), OWENS/CORNING FIBERGLAS, INC., E.I. DUPONT DE NEMOURS AND COMPANY, ROHM AND HAAS COMPANY, CITY OF PHILADELPHIA, GLOUCESTER TOWNSHIP, RICHARD WINN, DAVID EHRLICH, ANTHONY AMADEI, GEPPERT BROTHERS, INC. AND CURTIS T. BEDWELL AND SONS, INC. THESE PARTIES WERE ISSUED NOTICE LETTERS DATED AUGUST 1, 1985.

THIS LETTER INFORMED EACH OF THE PRPS, AMONG OTHER ITEMS, THAT:

A. EPA CONSIDERED THEM TO BE RESPONSIBLE PARTIES FOR THE GEMS SITE;

B. EPA HAD RECENTLY COMPLETED A REMEDIAL INVESTIGATION AND FEASIBILITY STUDY (RI/FS) FOR THE SITE;

C. EPA INTENDED TO SELECT A REMEDIAL ACTION FOR THE SITE BY MID-SEPTEMBER 1985;

D. COPIES OF THE RI/FS REPORT WERE AVAILABLE FOR THEIR REVIEW AT THE EPA-REGION II OFFICES AND AT FOUR (4) LOCATIONS IN NEW JERSEY;

E. COMMENTS ON THE RI/FS MUST BE SUBMITTED TO EPA NO LATER THAN AUGUST 23, 1985. (THIS WAS EXTENDED TO AUGUST 31, 1985); AND

F. EPA WOULD ASSUME THEY DO NOT WISH TO UNDERTAKE THE DESIGN OR REMEDIAL ACTION REQUIRED AT THE SITE IF THEY DID NOT RESPOND TO EPA WITHIN FOURTEEN (14) DAYS AFTER RECEIPT OF THE NOTICE LETTER.

ON SEPTEMBER 10, 1985, THE THREE (3) INDUSTRIAL PRPS LISTED ABOVE MET WITH EPA OFFICIALS TO DISCUSS THE GEMS SITE. EACH OF THE PRPS HAD THE OPPORTUNITY TO VOLUNTEER TO ASSIST WITH EVALUATION OF THE SITE, DESIGN THE RI/FS REMEDY AND THE SITE CLEANUP, RESPECTIVELY. AS OF THIS DATE, NONE OF THE PRPS FOR THE GEMS SITE HAS INDICATED ANY WILLINGNESS TO UNDERTAKE, ASSIST OR PAY FOR ANY ASPECT OF ANY OF THE FOLLOWING: (A) ANY PAST SITE STUDIES AT THE SITE, (B) THE DEVELOPMENT OF THE RI/FS, (C) THE DESIGN FOR THE RI/FS REMEDY FOR THE GEMS SITE OR, (D) THE SITE REMEDIAL ACTIONS PROPOSED BY THE RI/FS.

GEOLOGY AND HYDROGEOLOGY

THE GEMS LANDFILL SITE IS LOCATED IN THE COASTAL PLAIN IN AN AREA UNDERLAIN BY PLEISTOCENE, TERTIARY AND CRETACEOUS AGE SEDIMENTS. THE COASTAL PLAIN FORMATIONS BENEATH THE SITE DIP GENTLY (LT 1 DEGREE) TO THE SOUTHEAST AND GENERALLY BECOME THICKER IN THAT DIRECTION. THE GEOLOGIC FORMATIONS PERTINENT TO GEMS SITE INCLUDE (SEE FIGURE 3-1):

- THE BRIDGETON FORMATION, WHICH IS A PLEISTOCENE SAND AND GRAVEL THAT OCCURS ONLY BENEATH HILLTOPS IN THIS AREA. PORTIONS OF THIS FORMATION WERE PROBABLY EXCAVATED FOR THE LANDFILL.

- THE COHANSEY FORMATION, A TERTIARY AGE SAND UNIT THAT FORMS THE GROUND SURFACE FOR THIS AREA AND ALSO IS IN CONTACT WITH THE BASE OF THE LANDFILL.

- THE KIRKWOOD FORMATION, A TERTIARY AGE SILTY SAND UNIT, BELOW THE COHANSEY, THAT LIES ABOUT 40 FEET BENEATH THE LANDFILL AND IS ABOUT 35 TO 55 FEET THICK.

- THE MANASQUAN, VINCENTOWN, AND HORNERSTOWN FORMATIONS, UNDERLYING THE KIRKWOOD, ARE TERTIARY AGE CLAY, SANDY CLAY UNITS THAT ARE ABOUT 40 TO 75 FEET THICK.

- THE NAVESINK FORMATION IS A CRETACEOUS AGE SANDY CLAY ABOUT 30 FEET THICK.

- THE MOUNT LAUREL AND WENONAH FORMATIONS, UNDERLYING THE NAVESINK, ARE CRETACEOUS AGE SAND UNITS WITH A COMBINED THICKNESS OF 90 TO 120 FEET.

THE COHANSEY-KIRKWOOD FORMATIONS, AND THE MT. LAUREL-WENONAH FORMATIONS FORM TWO DISTINCT AQUIFERS BENEATH THE SITE. THE MANASQUAN-NAVESINK FORMATIONS COLLECTIVELY FORM AN AQUITARD WHICH EFFECTIVELY SEPARATES THE KIRKWOOD-COHANSEY AQUIFER FROM THE MT. LAUREL-WENONAH AQUIFER. SOME LOCAL WELLS ARE DEVELOPED IN THE KIRKWOOD-COHANSEY AQUIFER. THE MT. LAUREL-WENONAH AQUIFER IS AN IMPORTANT SOURCE OF MUNICIPAL WATER. THE VERTICAL GRADIENT BETWEEN THE COHANSEY-KIRKWOOD AQUIFER AND THE MT. LAUREL-WENONAH AQUIFER IS DOWNWARD. HOWEVER, THE CONNECTION BETWEEN AQUIFERS IS POOR BECAUSE OF THE THICK AQUITARD BETWEEN THEM.

THE KIRKWOOD-COHANSEY AQUIFER IS UNCONFINED TO SEMI-CONFINED. IN THIS SYSTEM, GROUND WATER GENERALLY FLOWS NORTH TO NORTHWEST. THE LANDFILL IS SITUATED DIRECTLY OVER THIS AQUIFER AND THE BASE OF THE LANDFILL LIES VERY CLOSE TO SAND, AND IN SOME AREAS, CONTACTS THE SATURATED ZONE. THE ESTIMATED GROUND WATER FLOW VELOCITY FOR THE KIRKWOOD-COHANSEY AQUIFER IS BETWEEN 10 TO 196 FEET PER YEAR. THIS RANGE OF GROUND WATER VELOCITIES REFLECTS A RANGE OF SUBSURFACE CONDITIONS ENCOUNTERED AT THE SITE. PERMEABILITIES RANGED FROM 4 X 10-3 TO 2 X 10-4 CENTIMETERS PER SECOND (CM/SEC) IN THE COHANSEY FORMATION TO 1 X 10-4 TO 6 X 10-5 CM/SEC IN THE KIRKWOOD FORMATION.

THE MOUNT LAUREL-WENONAH (MOUNT LAUREL) AQUIFER IS CONFINED AND GROUND WATER FLOWS SOUTH TO SOUTHEAST. THE GROUND WATER FLOW RATE IN THIS AQUIFER UNDER NATURAL CONDITIONS WAS ESTIMATED TO BE ABOUT 26 FEET PER YEAR. PERMEABILITY OF THE MOUNT LAUREL FORMATION IS APPROXIMATELY 10-3 CM/SEC.

REMEDIAL INVESTIGATION ACTIVITIES & RESULTS

REMEDIAL INVESTIGATION ACTIVITIES

THE REMEDIAL INVESTIGATION ACTIVITIES CONDUCTED AT THE GEMS LANDFILL SITE INCLUDED:

- HYDROGEOLOGIC AND GEOPHYSICAL INVESTIGATIONS TO DETERMINE GROUND WATER QUALITY, FLOW CHARACTERISTICS,

AND AQUIFER CHARACTERISTICS

- SURFACE WATER AND SEDIMENT SAMPLING OF SURFACE WATERS
- FIVE DAY, 24 HOUR, AIR SAMPLING
- GROSS ORGANIC VAPOR ANALYSES OF AMBIENT AIR BY PORTABLE ORGANIC VAPOR ANALYZERS
- SAMPLING OF LANDFILL GAS FROM NATURAL VENTS
- SUBSURFACE GAS SURVEY AND SAMPLING
- SURFACE LEACHATE SEEP SAMPLING
- TREATABILITY STUDIES OF THE LEACHATE TO DETERMINE REMOVAL EFFICIENCY OF AIR STRIPPING AND VAPOR PHASE CARBON LOADING TO REMOVE ORGANIC VAPORS FROM AIR STRIPPER OFF-GAS
- TREATABILITY STUDIES TO DETERMINE ACUTE TOXICITY, OVERALL TREATABILITY AND TOXICITY/INHIBITION OF PRETREATED LEACHATE TO THE ACTIVATED SLUDGE SYSTEM OF THE GLOUCESTER TOWNSHIP MUNICIPAL UTILITIES AUTHORITY (GTMUA) SEWAGE TREATMENT PLANT.

RESULTS

HYDROGEOLOGIC AND GEOPHYSICAL INVESTIGATIONS BY NUS CORP AND BY EPA REGION II'S TECHNICAL ASSISTANCE TEAM (TAT) WERE CONDUCTED AT THE SITE. THE INVESTIGATION INTO THE GROUND WATER CONCENTRATED ON THE KIRKWOOD/COHANSEY AND MOUNT LAUREL AQUIFERS. RESIDENTIAL WELLS WERE ALSO SAMPLED.

THE KIRKWOOD/COHANSEY AQUIFER WAS FOUND TO BE SEVERELY CONTAMINATED WITH ORGANICS AND INORGANICS. THE PLUME OF CONTAMINATION IS BELIEVED TO EXTEND APPROXIMATELY 800 FEET FROM THE SITE TO THE NORTH AND NORTHEAST. THE GENERAL DIRECTION OF GROUND WATER FLOW IN THE KIRKWOOD/COHANSEY WAS DETERMINED TO BE NORTHWEST. THE PLUME THAT APPEARS TO THE NORTHEAST IS PROBABLY DUE TO THE LOCAL INFLUENCE OF HOLLY RUN AND THE CONFIGURATION OF THE LANDFILL.

FIGURE 4-4 ILLUSTRATES THE ESTIMATED LOCATION OF THE PLUME IN THE KIRKWOOD-COHANSEY FORMATION. THIS FIGURE SHOWS A COMPONENT OF THE PLUME EXTENDING TO THE EAST AND SOUTH ALTHOUGH GENERAL PLUME TRANSPORT IS IN THE NORTHERLY DIRECTION. THESE PLUME COMPONENTS WERE BASED ON ANALYSES OF WELL 903A SAMPLES AND SURFACE CONDUCTIVITY RESULTS WHICH REVEALED THE PRESENCE OF A CONTAMINANT PLUME. THE AVAILABLE DATA ARE INSUFFICIENT TO EXPLAIN THE CONTRADICTION.

ANALYSES COMPLETED TO DATE HAVE NOT REVEALED ANY CONTAMINATION OF GROUND WATER IN THE MOUNT LAUREL AQUIFER TRACEABLE TO THE GEMS SITE. THE CURRENT FLOW IN THE MOUNT LAUREL IS AFFECTED BY AN ACTIVE MUNICIPAL SUPPLY WELL LOCATED APPROXIMATELY ONE MILE SOUTHEAST OF THE SITE. WATER LEVEL MEASUREMENTS INDICATE THAT THE SITE IS LOCATED OVER THE CONE OF DEPRESSION FORMED BY THE MUNICIPAL WELL. THEREFORE, LEACHATE FROM THE GEMS SITE COULD POTENTIALLY CONTAMINATE THIS MUNICIPAL WELL AT SOME FUTURE DATE.

NO RESIDENTIAL WELLS HAVE BEEN FOUND TO BE CONTAMINATED. HOWEVER, APPROXIMATELY 12 RESIDENTIAL WELLS COULD BE IMPACTED DUE TO EITHER FUTURE MIGRATION OF THE PLUME FROM THE GEMS SITE OR FROM LEAKS WHICH MAY DEVELOP IN THE SEALS OF THE WELLS THAT PREVENT DOWNWARD MIGRATION.

MONITORING WELLS DRILLED THROUGH THE LANDFILL INDICATE THAT THE LANDFILL INTRUDES INTO THE WATER TABLE, AND THAT THERE IS NO SIGNIFICANT MOUNDING OF WATER IN THE SITE ITSELF. HYDROGEOLOGIC STUDIES HAVE ALSO INDICATED THAT CONTAMINATED GROUND WATER IS BEING RELEASED FROM THE GEMS LANDFILL SITE INTO HOLLY RUN.

WATER QUALITY ANALYSES OF SAMPLES TAKEN FROM HOLLY RUN IN OCTOBER, 1983, MARCH, 1984, AND FEBRUARY 1985 ALSO INDICATE THAT THE LANDFILL IS HEAVILY CONTAMINATING THIS WATERWAY (APPENDIX I). SEVERAL HAZARDOUS SUBSTANCES WERE DISCOVERED IN HOLLY RUN, INCLUDING BENZENE, CHLOROBENZENE, DICHLOROETHANE, ACETONE, AND XYLENE. BRIAR LAKE APPEARS TO BE THE EDGE OF THE SIGNIFICANT DOWNSTREAM CONTAMINATION. HOWEVER, OBSERVATIONS BY NJDEP

PERSONNEL IN 1985 INDICATE THE IRON STAINING PRESENT IN HOLLY RUN AND BRIAR LAKE IS NOW APPEARING IN HOLLY LAKE 2000 FT DOWNSTREAM OF BRIAR LAKE. THIS INDICATES THAT CONTAMINATION HAS BEGUN TO MIGRATE PAST BRIAR LAKE.

IN ADDITION TO SAMPLES FROM HOLLY RUN, SURFACE WATER SAMPLES WERE COLLECTED FROM TOMS BRANCH AND FROM TWO STREAMS OUTSIDE THE SITE AREA TO ESTABLISH NATURALLY OCCURRING BACKGROUND CONCENTRATIONS FOR CERTAIN CONSTITUENTS. SEDIMENT SAMPLES WERE LIMITED TO HOLLY RUN DUE TO A LACK OF VISUAL EVIDENCE OF SEDIMENT TRANSPORT TO TOMS BRANCH. TOMS BRANCH SHOWED NO ORGANIC CONTAMINATION BUT DID SHOW ELEVATED LEVELS OF BARIUM AND LEAD. BECAUSE OF RECENT RUNOFF CONTROLS IMPLEMENTED BY THE STATE ALONG HICKSTOWN ROAD, TOMS BRANCH APPEARS TO BE POTENTIALLY IMPACTED BY THE SITE ONLY DURING STORM EVENTS.

VOLATILE ORGANIC COMPOUNDS (VOCS) ENTERING HOLLY RUN AND BRIAR LAKE FROM THE GEMS SITE APPEAR TO BE VOLATILIZING AND IMPACTING AMBIENT AIR QUALITY NEAR THESE WATERWAYS. AMBIENT AIR MONITORING CONDUCTED BY THE EPA'S TAT IN THE AREA BEHIND FOX CHASE II IN FEBRUARY, 1983 REVEALED GROSS ORGANIC VAPOR READINGS RANGING FROM 10 TO 40 PARTS PER MILLION. AIR SAMPLES, TAKEN OVER A FIVE DAY PERIOD BY THE NJDEP IN SEPTEMBER, 1983, ALSO INDICATED THAT THE AIR QUALITY AT THE SITE HAS BEEN SIGNIFICANTLY DEGRADED BY VOLATILE ORGANICS. THE HIGHEST CONCENTRATIONS WERE FOUND IN THE AREA BEHIND FOX CHASE II. DURING THESE SURVEYS, OFF-SITE CONCENTRATIONS OF VOLATILE ORGANICS ALTHOUGH ELEVATED, WERE NOT RECORDED AT LEVELS INDICATING AN IMMINENT HAZARD.

GASES EMANATING FROM THE LANDFILL REPRESENT ANOTHER SOURCE OF AIR QUALITY CONTAMINATION CAUSED BY THE SITE. FOUR NATURAL VENTS DISCHARGING LANDFILL GASES AND WATER VAPOR WERE MONITORED. ALL FOUR VENTS WERE FOUND TO BE DISCHARGING SIGNIFICANT CONCENTRATIONS OF METHANE. IN ONE OF THESE VENTS, SEVEN VOCS WERE DETECTED AT A TOTAL CONCENTRATION OF OVER 100 PARTS PER BILLION (PPB). THESE VOCS INCLUDED CHLOROBENZENE, BENZENE, AND TETRACHLOROETHENE.

THE SOIL ATMOSPHERE WAS INVESTIGATED IN TWO PHASES BY NUS. THE INVESTIGATION REVEALED THAT METHANE WAS MIGRATING FROM THE SITE IN THE UNSATURATED ZONE AT CONCENTRATIONS GREATER THAN 100% OF THE LOWER EXPLOSIVE LIMIT (LEL). SEVERAL VOLATILE ORGANICS WERE ALSO DETECTED IN THE SOIL ATMOSPHERE, AT CONCENTRATIONS UP TO 9000 PPB OF TOTAL VOLATILES. THESE INCLUDED CHLOROBENZENE, BENZENE, TOLUENE, 1,2,-DICHLOROETHENE, TRICHLOROETHENE AND TETRACHLOROETHENE. METHANE AND VOLATILE ORGANICS WERE FOUND IMMEDIATELY ADJACENT TO THE FOUNDATIONS OF HOMES IN FOX CHASE II. NO GROSS ORGANIC VAPORS OR METHANE WERE FOUND IN THE BASEMENTS OF THESE HOMES THAT WERE NOT ATTRIBUTABLE TO BASEMENT SOURCES (I.E. DIESEL FUEL).

SEVERAL SURFACE LEACHATE SEEPS WERE SAMPLED DURING THE REMEDIAL INVESTIGATION. HOWEVER, DUE TO THE TIME OF YEAR, ONLY ONE SEEP HAD FLOWING LIQUID; THE OTHER SAMPLES WERE OF THE STAINED SOIL AT THE SEEP. THE PREDOMINANT COMPOUNDS FOUND WERE POLYNUCLEAR AROMATICS INCLUDING BENZO-A-PYRENE. TRACE LEVELS (1 PPB) OF DDE, DDD, AND DDT WERE ALSO FOUND.

THE RESULTS OF THE TREATABILITY STUDY SHOW THAT THE LEACHATE IS TREATABLE WITH A COMBINATION OF ON-SITE PRETREATMENT (AIR STRIPPING) AND OFF-SITE TREATMENT AT THE LOCAL ACTIVATED SLUDGE SEWAGE TREATMENT PLANT. THE STUDY ALSO INDICATES THAT ON-SITE TREATMENT WITH ACTIVATED SLUDGE WOULD BE EFFECTIVE.

IN SUMMARY, THE RESULTS OF THE ENVIRONMENTAL STUDIES AT AND IN THE VICINITY OF THE GEMS SITE HAVE INDICATED, AMONG OTHER ITEMS, THAT:

1. HAZARDOUS SUBSTANCES (HSS) AND VAPORS CONTAINING HSS EXIST IN THE SOILS AT THE GEMS SITE;

2. PORTIONS OF THE GEMS LANDFILL ARE IN DIRECT CONTACT WITH THE GROUND WATER SYSTEM (COHANSEY-KIRKWOOD) BENEATH THE SITE;

3. HSS ARE BEING RELEASED FROM THE GEMS LANDFILL INTO THE GROUND WATER SYSTEM (COHANSEY-KIRKWOOD) BENEATH THE SITE;

4. HSS HAVE BEEN TRANSPORTED IN THE COHANSEY-KIRKWOOD AQUIFER FROM THE GEMS SITE UP TO 800 FEET BEYOND THE NORTHEAST BOUNDARY OF THE SITE;

5. WATER FROM A PORTION OF THE MT. LAUREL AQUIFER BENEATH THE GEMS SITE IS FLOWING TOWARD A MUNICIPAL WATER SUPPLY WELL AND, THEREFORE, THE WELL COULD BECOME CONTAMINATED WITH HSS AND OTHER POLLUTANTS OR CONTAMINANTS AT SOME FUTURE DATE;

6. HSS HAVE ENTERED HOLLY RUN, A CLASS FW-2 STREAM WHICH ADJOINS THE GEMS SITE; THE LEVELS OF THESE SUBSTANCES IN THE WATERWAY ARE GREATER THAN LEVELS WHICH ARE BELIEVED TO BE ACUTELY AND CHRONICALLY TOXIC TO AQUATIC BIOTA;

7. VOLATILE ORGANIC COMPOUNDS (VOCS) DETECTED AT BOTH THE GEMS SITE AND IN HOLLY RUN ARE VOLATILIZING INTO THE ATMOSPHERE AND SIGNIFICANTLY DEGRADING AIR QUALITY IN THE VICINITY OF HOLLY RUN;

8. GASES CONTAINING VOCS AND HSS ARE EMANATING DIRECTLY FROM THE LANDFILL SITE INTO THE ABOVE ATMOSPHERE IN THE VICINITY OF THE SITE;

9. RESIDENTS AT AND IN THE VICINITY OF THE SITE COULD BE EXPOSED TO A GREATER CARCINOGENIC RISK AND OTHER ADVERSE HEALTH EFFECTS IF: A) THEY INHALE VOLATILIZED HSS OR CONTAMINANTS BEING RELEASED FROM HOLLY RUN, B) THEY INHALE GASES EMANATING FROM THE GEMS SITE, OR C) THEY MAKE DERMAL CONTACT WITH OR INGEST RUNOFF OR LEACHATE FROM THE GEMS SITE, WATERS IN HOLLY RUN, OR SEDIMENTS CONTAMINATED WITH HSS FROM THE GEMS SITE.

RISK ASSESSMENT

TO ASSESS THE POTENTIAL PUBLIC HEALTH RISKS POSED BY THE PRESENCE OF KNOWN OR SUSPECTED CARCINOGENS AT THE SITE, A RISK ASSESSMENT WAS CONDUCTED. POTENTIAL ROUTES OF EXPOSURE TO RECEPTORS WERE IDENTIFIED. ALSO, MEASURED CONCENTRATIONS OF CONTAMINANTS OF CONCERN WERE COMPARED TO RELEVANT AND APPLICABLE CRITERIA AND ASSOCIATED RISKS WERE CALCULATED. THE RESULTS OF THIS WORK ARE DISPLAYED IN TABLES 5-1 THROUGH 5-8, ATTACHED AS APPENDIX II.

THE CONCLUSIONS OF THE ASSESSMENT ARE SUMMARIZED BELOW:

- AMBIENT AIR SAMPLING CONDUCTED IN SEPTEMBER, 1983 INDICATES THAT A POTENTIAL CARCINOGENIC RISK IS ASSOCIATED WITH INHALATION OF ON-SITE AMBIENT AIR.

- THE DETECTION OF COMBUSTIBLE GASES IN EXCESS OF THE LOWER EXPLOSION LIMIT IN SOIL ATMOSPHERE SAMPLES SUGGEST THE POTENTIAL FOR FIRE AND/OR EXPLOSION HAZARDS. IN ADDITION, ORGANIC COMPOUNDS IN THE LANDFILL GASES MAY HAVE ASSOCIATED HEALTH IMPLICATIONS. THE PRESENCE OF HYDROCARBON GASES ALSO AFFECTS THE QUALITY OF THE LOCAL ENVIRONMENT.

- THE MAJOR EXPOSURE PATH AND SUBSEQUENT RISK IS THE INGESTION OF CONTAMINATED GROUND WATER. THERE WOULD BE A POTENTIAL FOR ACUTE, CHRONIC, AND CARCINOGENIC HEALTH RISKS IF THE CONTAMINANTS WERE INGESTED AT THE OBSERVED CONCENTRATIONS IN GROUND WATER. ALTHOUGH THE AVAILABLE DATA INDICATE THAT RECEPTORS ARE PRESENTLY NOT EXPOSED TO SIGNIFICANT LEVELS OF CONTAMINANTS IN DRINKING WATER, RECEPTORS MAY BE EXPOSED AT SOME FUTURE TIME IF THE CONTAMINANTS WOULD MIGRATE VIA GROUND WATER TO WELLS USED FOR DRINKING PURPOSES. RECEPTORS WITH WATER WELLS PUMPING FROM THE COHANSEY-KIRKWOOD AQUIFER (OR THOSE THAT PENETRATE DEEPER AQUIFERS WHICH HAVE LEAKY SEALS OR CASINGS) HAVE THE GREATEST RISK OF EXPOSURE.

- ACUTE AND CHRONIC INGESTION, INHALATION, OR DERMAL EXPOSURE TO SURFACE WATER, SEDIMENTS, OR LEACHATE MAY BE ASSOCIATED WITH HEALTH IMPLICATIONS.

- ANOTHER POSSIBLE MODE OF HUMAN EXPOSURE IS VIA INGESTION IN THE FOOD CHAIN, I.E., THE CONSUMPTION OF AQUATIC BIOTA FROM HOLLY RUN OR BRIAR LAKE. CONTAMINANTS OF CONCERN INCLUDE BENZENE, METHYLENE CHLORIDE, CHLOROFORM, BIS(2-CHLOROETHYL)ETHER, BIS(2-ETHYLHEXYL)PHTHALATE, LEAD, ARSENIC, CADMIUM, AND CHROMIUM.

- ENVIRONMENTAL RECEPTORS MAY BE AFFECTED BY THE SITE. ACUTE AND CHRONIC TOXIC EFFECTS TO AQUATIC BIOTA ARE LIKELY.

INITIAL REMEDIAL MEASURE

TO ADDRESS THE CONTAMINATION OF HOLLY RUN AND THE SUBSEQUENT VOLATILIZATION OF ORGANIC CHEMICALS INTO THE AMBIENT AIR, AN INITIAL REMEDIAL MEASURE (IRM) FOR THE AREA BEHIND THE FOX CHASE II DEVELOPMENT (STUDY AREA) WAS PROPOSED FOR THE GEMS SITE. A FOCUSED FEASIBILITY STUDY (FFS) WAS COMPLETED IN ACCORDANCE WITH EPA GUIDANCE TO DETERMINE THE COST-EFFECTIVE REMEDIAL ALTERNATIVE TO ADDRESS THE CONTAMINATION OF HOLLY RUN AND MINIMIZE THE DEGRADATION OF THE AIR QUALITY IN THE FOX CHASE II AREA.

TO ACCOMPLISH THIS GOAL, IT WAS DETERMINED THAT THE DISCHARGE OF LEACHATE INTO HOLLY RUN WOULD NEED TO BE VIRTUALLY ELIMINATED. IF IT WERE ELIMINATED THROUGH A GROUND WATER COLLECTION SYSTEM, THE LEACHATE WOULD HAVE TO BE PROPERLY TREATED. AN ON-SITE PRETREATMENT SYSTEM TO REMOVE VOLATILE ORGANIC CHEMICALS WAS DEEMED NECESSARY SINCE ANY OFF-SITE TRANSMISSION OF THE LEACHATE WOULD ONLY CHANGE THE LOCATION OF WHERE THE CHEMICALS VOLATILIZED AND WOULD NOT REMOVE THEM FROM THE ENVIRONMENT. BECAUSE IT IS A PROVEN, EFFECTIVE TECHNOLOGY, AIR STRIPPING WAS CHOSEN TO REMOVE VOLATILES FROM THE LEACHATE. TO COLLECT THE STRIPPED VOLATILE ORGANIC COMPOUNDS (VOCS), VAPOR PHASE ACTIVATED CARBON UNITS WERE INCLUDED AS PART OF THE PRETREATMENT SYSTEM. AFTER AIR STRIPPING, THE LEACHATE WOULD REQUIRE FURTHER TREATMENT PRIOR TO ITS ULTIMATE DISCHARGE. THE LOCAL POTW WHICH SERVES THE AREA NEAR THE SITE UTILIZES AN ACTIVATED SLUDGE TREATMENT SYSTEM. THE ANALYSIS OF THE LEACHATE FOR STANDARD WATER POLLUTANTS INDICATED THAT, WITH PROPER PRETREATMENT, THE ACTIVATED SLUDGE SYSTEM WOULD BE ABLE TO TREAT THE LEACHATE PRIOR TO ULTIMATE DISCHARGE. THE TREATABILITY STUDIES NECESSARY TO CONFIRM THIS WERE INITIATED CONCURRENTLY WITH THE FFS.

SCREENING OF REMEDIAL TECHNOLOGIES

THE REMEDIAL TECHNOLOGIES EVALUATED TO PREVENT THE LEACHATE FROM ENTERING HOLLY RUN WERE:

- IMPERMEABLE BARRIERS
- GROUND WATER PUMPING/TREATMENT
- GROUND WATER COLLECTION TRENCHES
- RELOCATING HOLLY RUN
- SURFACE RUNOFF DIVERSION
- NO ACTION.

THE CRITERIA USED IN THE INITIAL SCREENING OF THE TECHNIQUES CONSISTED OF:

- THE TECHNOLOGICAL STATUS OF THE TECHNIQUE
- THE EFFECTIVENESS AND APPLICABILITY
- CONSTRAINTS OF THE TECHNIQUE WHEN APPLIED TO THIS SITUATION.

IMPERMEABLE BARRIERS WERE ELIMINATED IN THE INITIAL SCREENING ON THE BASIS OF EFFECTIVENESS AND TECHNICAL CONSTRAINTS. BARRIERS ARE EFFECTIVE WHEN ANCHORED INTO A LOW PERMEABILITY LAYER WHICH WOULD FORM THE BOTTOM OF THE CONTAINMENT. THE UPPERMOST NATURAL LOW PERMEABILITY FORMATION AT THE SITE OCCURS APPROXIMATELY 140 FEET BELOW THE GROUND SURFACE. THIS DEPTH IS CONSIDERED EXCESSIVE FOR THE INSTALLATION OF EFFECTIVE BARRIERS.

BOTH OF THE SURFACE WATER CONTROL TECHNOLOGIES, RELOCATING HOLLY RUN AND SURFACE RUNOFF DIVERSION, WERE RETAINED WITH THE GROUND WATER CONTROL TECHNOLOGIES. RELOCATING AND ISOLATING HOLLY RUN WOULD ELIMINATE LEACHATE FROM ENTERING HOLLY RUN WHERE IT WAS ISOLATED, BUT WOULD ALLOW THE LEACHATE TO DISCHARGE EITHER ADJACENT TO THE NEW CHANNEL OR AT THE OUTFALL OF THE CHANNEL. ALSO, THESE TECHNOLOGIES WOULD NOT ELIMINATE THE POTENTIAL FOR BOCS FROM THE GROUND WATER TO ENTER THE HOMES IN FOX CHASE II VIA MIGRATION BEYOND THE NEW CHANNEL OF HOLLY RUN. SURFACE RUNOFF ACCOUNTS, ON THE AVERAGE, FOR A VERY SMALL PORTION OF THE LEACHATE ENTERING HOLLY RUN. THEREFORE, SURFACE RUNOFF CONTROL WOULD HAVE LITTLE EFFECT ON ELIMINATING THE LEACHATE ENTERING HOLLY RUN. BOTH THESE TECHNOLOGIES, WHEN USED IN CONJUNCTION WITH GROUNDWATER COLLECTION, SIGNIFICANTLY REDUCE THE AMOUNT OF SURFACE WATER WHICH WOULD ENTER THE COLLECTION SYSTEM. REDUCTION OF THE QUANTITY OF SURFACE WATER RUNOFF ENTERING THE COLLECTION AREA WOULD ALLOW REDUCTION IN THE SIZING OF THE COLLECTION AND TREATMENT SYSTEM.

ALTERNATIVES

AFTER THE SCREENING OF THE INITIAL REMEDIAL TECHNOLOGIES, TWO ALTERNATIVES WERE DEVELOPED FOR DETAILED EVALUATION.

A) SURFACE WATER CONTROL AND GROUND WATER COLLECTION TRENCHES/TREATMENT

B) SURFACE WATER CONTROL AND GROUND WATER PUMPING WELLS/TREATMENT

THE CRITERIA USED FOR THE DETAILED EVALUATION INCLUDED:

- **!** TECHNICAL FEASIBILITY
  - CONSTRUCTABILITY/IMPLEMENTABILITY
  - TIME REQUIRED TO IMPLEMENT
  - OPERATION AND MAINTENANCE (O&M)
  - PAST PERFORMANCE
- **!** ENVIRONMENTAL EFFECTIVENESS
  - ABILITY TO MEET REMEDIAL GOALS
  - ADVERSE ENVIRONMENTAL IMPACTS DURING IMPLEMENTATION
- **!** PUBLIC/WORKER HEALTH AND SAFETY DURING IMPLEMENTATION
- **!** INSTITUTIONAL/REGULATORY CONSTRAINTS
- **!** COST
  - CAPITAL
  - OPERATION AND MAINTENANCE
  - TOTAL PRESENT WORTH FOR 5 YEAR OPERATING LIFE OF AN IRM.

SURFACE WATER CONTROLS AND TREATMENT ARE COMPONENTS OF BOTH ALTERNATIVES AND WERE EVALUATED SEPARATELY.

SURFACE WATER CONTROL

THE SURFACE WATER CONTROL CONSISTS OF RELOCATING HOLLY RUN TO NEAR ITS ORIGINAL COURSE AND LIMITED REGRADING TO CONTROL SURFACE RUNOFF WITHIN THE STUDY AREA.

THE SURFACE WATER CONTROL TECHNIQUES INVOLVE STANDARD ENGINEERING PRACTICES. A NEW CHANNEL WOULD BE CONSTRUCTED FOR HOLLY RUN (SEE ATTACHMENT 1, FIGURE 4-1). THE CHANNEL WOULD BE TRAPEZOIDAL ABOUT 2 TO 3 FEET DEEP AND 6 FEET WIDE AT THE TOP WITH SIDE SLOPES OF 3:1. IT WOULD BE CONSTRUCTED TO PREVENT GROUND WATER/SURFACE WATER INTERACTION. THE CHANNEL IS SIZED TO ACCOMMODATE THE 100 YEAR 24 HOUR STORM FLOW OF 250 CUBIC FEET PER SECOND.

THE EXISTING CHANNEL OF HOLLY RUN WOULD BE REGRADED TO COLLECT AND TRANSPORT SURFACE RUNOFF NORTH TO A DETENTION POND AND THEN TO HOLLY RUN NORTH OF THE STUDY AREA. THE CURRENT RUNOFF CHANNELS FROM THE LANDFILL WOULD BE FILLED AND THE AREA REGRADED TO DIRECT THE FLOW NORTH TO THE DETENTION POND.

THE SURFACE WATER CONTROLS WOULD SUBSTANTIALLY REDUCE THE SURFACE WATER INFILTRATION INTO THE GROUND WATER COLLECTION SYSTEM AND WOULD DRAIN THE MARSH SOUTH OF THE STUDY AREA. THE MARSH WAS CREATED WHEN HOLLY RUN WAS RELOCATED, AND HAS CONTRIBUTED TO THE VEGETATIVE STRESS OBSERVED IN THIS AREA.

EXCAVATION FOR THE NEW CHANNEL MAY RESULT IN TEMPORARY ADDITIONAL VOLATILIZATION OF VOC FROM THE GROUND WATER DURING CONSTRUCTION. HOWEVER, BY LIMITING THE AREA EXCAVATED TO SMALL SECTIONS, RELEASES OF VOC COULD BE MINIMIZED. THESE RELEASES WOULD BE EXPECTED TO READILY DISSIPATE A VERY SHORT DISTANCE FROM THE EXCAVATIONS AND WILL BE CONTINUOUSLY MONITORED DURING THE CONSTRUCTION. THESE TEMPORARY ADDITIONAL RELEASES OF VOC ARE NOT EXPECTED TO ADVERSELY AFFECT THE RESIDENTS NEARBY.

THERE WOULD BE NO TECHNICAL CONSTRAINTS ASSOCIATED WITH THE SURFACE WATER CONTROL MEASURES. A STREAM ENCROACHMENT PERMIT AND ACCESS AGREEMENTS WITH THE PROPERTY OWNERS WOULD BE REQUIRED. COUNTY SEDIMENTATION AND EROSION PERMITS MAY BE REQUIRED. THESE CONSTRAINTS ARE NOT EXPECTED TO SIGNIFICANTLY INHIBIT IMPLEMENTATION OF THESE MEASURES ALTHOUGH SOME DELAYS MAY BE ENCOUNTERED.

THE ESTIMATED CAPITAL COST FOR CONSTRUCTING THE NEW, LINED CHANNEL IS $157,200, WHILE ESTIMATED CAPITAL COST FOR THE SURFACE RUNOFF COLLECTION IS $5,500. THESE COSTS INCLUDE ALL SITE EROSION AND CONTROL REQUIREMENTS AND THE REVEGETATION OF DISTURBED AREAS.

TREATMENT

THE TREATMENT SYSTEM CONSISTS OF AIR STRIPPING TO REMOVE VOCS FROM THE COLLECTED LEACHATE AND VAPOR PHASE CARBON TO REMOVE THE VOCS FROM THE STRIPPER'S EFFLUENT OFF-GAS.

THE USE OF AIR STRIPPING TO REMOVE VOCS FROM WATER IS A PROVEN, EFFECTIVE TECHNOLOGY. LIKEWISE, VAPOR PHASE CARBON IS A PROVEN, EFFECTIVE TECHNOLOGY FOR REMOVING VOCS FROM AIR. THE TWO TECHNOLOGIES WILL BE EFFECTIVE (+99% REMOVAL) IN REMOVING THE VOCS.

THE AIR STRIPPER TO BE USED FOR THIS IRM WOULD CONSIST OF TWO PACKED COLUMNS. THE SYSTEM IS DESIGNED TO REMOVE THE MAXIMUM EXPECTED CONCENTRATION OF 32 PPM AT A FLOW RATE OF UP TO 60 GPM. THE AVERAGE EXPECTED CONCENTRATION OF 11 PPM AT A FLOW RATE OF APPROXIMATELY 40 GPM COULD BE EFFECTIVELY TREATED BY ONLY ONE COLUMN. PROVISION OF TWO COLUMNS WOULD ALLOW FOR THE COLUMNS TO BE OPERATED ALTERNATELY SO THAT ROUTINE MAINTENANCE COULD BE PERFORMED ON ONE COLUMN WHILE THE SYSTEM IS OPERATING USING THE OTHER COLUMN. IF CONCENTRATIONS OR FLOW RATES ARE HIGHER THAN EXPECTED, BOTH COLUMNS COULD BE USED TO EFFECTIVELY TREAT THE LEACHATE.

THE ACTIVATED CARBON TREATMENT OF THE AIR STRIPPER OFF-GAS WOULD CONSIST OF A SERIES OF 6 INDIVIDUAL CARBON UNITS PLACED IN SERIES FOR THE MAXIMUM EXPECTED CONCENTRATION OF 32 PPM TOTAL VOC (TVOC). ONLY 4 UNITS ARE NECESSARY TO EFFECTIVELY REMOVE THE VOCS AT THE EXPECTED AVERAGE CONCENTRATION OF 11 PPM TVOC AND THE MINIMUM CONCENTRATION OF 2 PPM TVOC. THE FIRST UNIT WOULD ADSORB THE MAJORITY OF THE CONTAMINANTS AND WOULD BE SATURATED BEFORE THE OTHERS. THE SYSTEM WOULD BE DESIGNED TO ALLOW A CLEAN UNIT TO BE PLACED AT THE END OF THE SERIES, AND THE FIRST SPENT UNIT TO BE TAKEN OUT OF THE SYSTEM AND SENT OFF SITE FOR DISPOSAL OR REGENERATION. THIS ALLOWS FOR CONTINUOUS OPERATION OF THE SYSTEM DURING ROUTINE MAINTENANCE.

THE TREATMENT SYSTEM WAS BASED ON THE RESULTS OF THE TREATABILITY STUDY. THE AIR STRIPPER SYSTEM REMOVED THE VOCS TO BELOW DETECTION LIMITS (10 UG/L). THIS REPRESENTS A REMOVAL EFFICIENCY OF OVER 99%. THE ONLY EXCEPTION IS METHYLENE CHLORIDE WHICH WAS PRESENT AFTER AIR STRIPPING AT 15 UG/L.

HOWEVER, CONSIDERING THAT THE METHYLENE CHLORIDE CONCENTRATION BEFORE AIR STRIPPING WAS 15,000 UG/L, THE REMOVAL EFFICIENCY IS 99.9%. THE CARBON UNITS WERE DESIGNED BASED ON THE TREATABILITY STUDY CARBON LOADING WHICH REMOVED ALL THE VOCS TO BELOW DETECTION LIMITS (25 UG/L). THIS REPRESENTS A REMOVAL EFFICIENCY OF OVER 99% FOR THE CARBON UNITS.

AFTER AIR STRIPPING, THE LEACHATE WOULD STILL CONTAIN OTHER POLLUTANTS WHICH WOULD PREVENT ITS DISCHARGE TO ADJACENT SURFACE WATERS. THE FFS WAS CONDUCTED ASSUMING THAT THE LEACHATE WOULD BE FURTHER TREATED AT THE GTMUA SEWAGE TREATMENT PLANT. THE TREATABILITY STUDIES CONDUCTED CONCURRENTLY WITH THE FFS DETERMINED THAT ZINC IN THE LEACHATE REPRESENTED THE ONLY CONTAMINANT THAT COULD CAUSE INHIBITORY EFFECTS ON THE NORMAL OPERATION OF THE TREATMENT PLANT. THE STUDY'S RECOMMENDATION THAT THE LEACHATE NOT BE FAVORABLY CONSIDERED FOR DISCHARGE TO THE GTMUA WAS BASED ON THE FLOW RATIO OF 4.63:1. (STATE REGULATIONS REQUIRE TREATABILITY STUDIES TO BE CONDUCTED AT 5 TIMES THE EXPECTED FLOW RATE TO THE POTW). THE MAXIMUM DESIGN FLOW FOR THE PRETREATMENT SYSTEM IS 60 GPM OR 83,000 GPD. THE ACTUAL FLOW RATIO WOULD BE APPROXIMATELY 20:1, AND THEREFORE, THE ZINC LEVELS WOULD BE WELL BELOW INHIBITORY LEVELS.

THE NJDEP HAS DISCUSSED THE POTENTIAL ZINC PROBLEM WITH THE GTMUA. BASED ON WHAT THE ACTUAL FLOW RATIO WOULD BE, THE GTMUA HAS INDICATED THAT PRETREATMENT OF THE LEACHATE TO REMOVE THE ZINC WOULD NOT BE REQUIRED. HOWEVER, THE GTMUA EXPECTS TO BEGIN INCINERATING THE SLUDGE FROM THE POTW WITHIN THE YEAR. AT THAT TIME, THE METALS CONCENTRATION IN THE GEMS LEACHATE MAY DICTATE THAT REMOVAL OF THE METALS DURING PRETREATMENT MAY BE

REQUIRED. FURTHER SAMPLING AND ANALYSES TO CONFIRM THE CONCENTRATIONS OF ZINC FOUND ORIGINALLY ARE BEING CONDUCTED BY THE NJDEP.

CONSTRUCTION OF THE ON-SITE PRETREATMENT SYSTEM IS NOT EXPECTED TO ENDANGER THE PUBLIC/WORKERS OR PRODUCE ANY ADVERSE HEALTH AND SAFETY EFFECTS. OPERATION OF THE TREATMENT SYSTEM IS EXPECTED TO SIGNIFICANTLY REDUCE THE POTENTIAL ADVERSE EFFECTS AT THE SITE AND IS NOT EXPECTED TO PRODUCE ANY ADVERSE IMPACTS. THE SYSTEM FULLY CONTAINS THE HAZARDOUS SUBSTANCES AND THEREFORE WOULD NOT PRESENT ANY THREAT TO THE OPERATORS.

THE COSTS ASSOCIATED WITH THE AIR STRIPPING OF VOLATILE ORGANICS FROM THE GROUND WATER INCLUDE CAPITAL COSTS FOR: THE AIR STRIPPER UNIT AND THE ASSOCIATED EQUIPMENT, CARBON ADSORPTION VAPOR PHASE TREATMENT, AND OPERATING AND MAINTENANCE COSTS FOR A 34-DAY OPERATING YEAR (INCLUDING LABOR). THE FIVE-YEAR PRESENT WORTH COSTS FOR OPERATION AND MAINTENANCE ARE ALSO GIVEN. BOTH CAPITAL AND OPERATION AND MAINTENANCE COSTS REFLECT THE USE OF THE THREE DIFFERENT TREATMENT LEVELS WHICH MAY BE ENCOUNTERED.

THE COST BREAKDOWN FOR EACH LEVEL IS AS FOLLOWS:

INFLUENT TOTAL VOLATILE ORGANIC CONCENTRATIONS	CAPITAL	ANNUAL * O&M	5-YR PRESENT WORTH
32 PPM CASE (MAXIMUM)	$239,100	$541,000	$2,290,300
10.8 PPM CASE (AVERAGE)	$206,000	$311,100	$1,385,500
2 PPM CASE (MINIMUM)	$206,000	$204,700	$ 980,000

* THESE COSTS INCLUDE THE ESTIMATED $150,000/YR TREATMENT CHARGE FOR DISCHARGE TO THE GTMUA.

ALTERNATIVE A

SURFACE WATER CONTROL, GROUND WATER COLLECTION TRENCHES/TREATMENT

SURFACE WATER CONTROL AND TREATMENT WERE PREVIOUSLY DISCUSSED. THIS ALTERNATIVE WOULD INCORPORATE GROUND WATER COLLECTION TRENCHES TO LOWER THE GROUND WATER TABLE AND COLLECT THE WATER FOR TREATMENT.

TWO SYSTEMS WERE EVALUATED. ONE SYSTEM INCLUDED A DEEP SINGLE TRENCH (UP TO 12 FEET DEEP) AND THE OTHER EVALUATED A TWO-TRENCH SYSTEM THAT WAS SET TO A DEPTH OF 6 FEET. THE TWO-TRENCH SYSTEM WOULD INVOLVE TWO TRENCHES PARALLEL TO EACH OTHER ABOUT 50 FEET APART. THEY WOULD BE CONSTRUCTED IN THE SAME MANNER AS THE SINGLE TRENCH EXCEPT FOR DEPTH. BOTH SYSTEMS WOULD REDUCE THE GROUND WATER LEVELS AND MINIMIZE GROUND WATER DISCHARGES TO HOLLY RUN. AFTER THE TRENCH IS EXCAVATED, A PERFORATED FLEXIBLE POLYETHYLENE DRAINAGE PIPE WOULD BE PLACED NEAR THE BOTTOM AND BACKFILLED WITH SAND AND GRAVEL. TO DECREASE THE POSSIBILITY OF FINE MATERIALS FROM ENTERING THE PIPE, A LAYER OF FILTER FABRIC WOULD BE INSTALLED AROUND THE SAND AND GRAVEL. A GRADED BACKFILL WOULD BE USED TO FILL THE TRENCH TO ABOUT 2 FEET BELOW THE SURFACE WHERE COMPACTED CLAY BACKFILL WOULD BE PLACED TO REDUCE SURFACE INFILTRATION. BECAUSE OF THE GRADIENTS REQUIRED TO EFFECTIVELY DRAIN THE LEACHATE, A SUMP PIT, APPROXIMATELY 20 FEET DEEP, WOULD BE INSTALLED TO COLLECT AND FEED THE LEACHATE TO THE TREATMENT SYSTEM.

GROUND WATER CONTROL THROUGH COLLECTION TRENCHES IS A PROVEN TECHNOLOGY. HOWEVER, AT THIS SITE, THE COMBINATION OF A HIGH WATER TABLE, UNCONSOLIDATED SOILS, AND CONTAMINATED GROUNDWATER/SOILS WOULD CAUSE CONSTRUCTION DIFFICULTIES THAT WOULD REQUIRE ADDITIONAL PRECAUTIONS.

SHORING AND DEWATERING WOULD BE REQUIRED TO MAINTAIN THE TRENCH STABILITY. DUE TO THE POTENTIAL FOR RELEASE OF VOC FROM THE TRENCH, WORKERS WOULD BE REQUIRED TO WEAR PROTECTIVE CLOTHING AND RESPIRATORY PROTECTION.

THIS WOULD SIGNIFICANTLY ADD TO THE TIME TO CONSTRUCT THE TRENCH SINCE IT WOULD INHIBIT THE EFFICIENCY OF THE WORKERS.

COLLECTION TRENCHES WILL LOWER THE WATER TABLE AT HOLLY RUN AND WILL INTERCEPT SOME OF THE LEACHATE PLUME AND DECREASE THE RATE OF MIGRATION OF THE PLUME. SINCE MOST OF THE CONTAMINANTS ARE IN SOLUTION, AS OPPOSED TO PRECIPITATED CONTAMINANTS THAT BOND TO THE SOIL, THE CONTAMINANTS WOULD BE REMOVED THROUGH GROUND WATER COLLECTION. GROUND WATER COLLECTION/TREATMENT COMBINED WITH SURFACE WATER CONTROL MEASURES WOULD HAVE A BENEFICIAL EFFECT ON THE ENVIRONMENT. THE CONTAMINANTS WOULD BE PREVENTED FROM ENTERING THE STREAM AND WOULD BE REMOVED FROM THE ENVIRONMENT THROUGH GROUND WATER TREATMENT.

WORKER SAFETY DURING CONSTRUCTION WAS PREVIOUSLY DISCUSSED. VOLATILIZATION OF VOCS DURING CONSTRUCTION OF THE TRENCH IS EXPECTED. THE DEWATERING SYSTEM REQUIRED FOR CONSTRUCTION SHOULD ALSO REDUCE THE AMOUNT OF VOCS RELEASED. THE VOCS THAT ARE RELEASED SHOULD ONLY PRESENT A HAZARD TO THE WORKERS AND NOT THE GENERAL PUBLIC SINCE THEY WOULD COLLECT IN THE TRENCH AND NOT READILY DISPERSE. LIMITING THE AREA OF OPEN EXCAVATION WOULD ALSO REDUCE THE AMOUNT OF VOCS RELEASED TO THE AMBIENT AIR.

AFTER CONSTRUCTION, THE ONLY FACET OF THE TRENCH SYSTEM WHICH WOULD PRESENT A HAZARD IS THE SUMP PIT WHICH WILL BE PROPERLY SECURED TO PREVENT UNAUTHORIZED ACCESS.

TECHNICAL CONSTRAINTS OF THE TRENCH COLLECTION SYSTEM WERE DISCUSSED ABOVE. THE DEWATERING SYSTEM WOULD REQUIRE WELL PERMITS.

COSTS FOR CONSTRUCTION OF THE SINGLE AND DOUBLE TRENCH ALTERNATIVES ARE ESTIMATED AT $581,000 AND $815,000, RESPECTIVELY. THESE COSTS ARE IN ADDITION TO CAPITAL AND O&M COSTS FOR TREATMENT AND SURFACE WATER CONTROL.

ALTERNATIVE B

SURFACE WATER CONTROL, GROUND WATER PUMPING WELLS/TREATMENT

THIS ALTERNATIVE INCORPORATES SURFACE WATER CONTROL, GROUND WATER COLLECTION WITH PUMPING WELLS, AND SUBSEQUENT TREATMENT OF COLLECTED WATER. SURFACE WATER CONTROL AND TREATMENT WERE PREVIOUSLY DISCUSSED.

BASED ON A COMPUTER MODEL, IT WAS DETERMINED THAT THREE WELLS, PUMPING AT A COMBINED FLOW OF 39 GPM, COULD PRODUCE THE DESIRED DRAWDOWN OF 4 FEET THROUGH THE STUDY AREA. THE LOCATIONS OF THESE WELLS ARE SHOWN ON FIGURE 4-6 IN ATTACHMENT 1. FOR CONSERVATIVE DESIGN, THESE THREE WELLS ARE AUGMENTED BY TWO ADDITIONAL WELLS TO PROVIDE FOR BACKUP IN CASE OF WELL MALFUNCTION. ALSO, THE FIVE-WELL SYSTEM COULD YIELD AN AVERAGE OF 51 GPM FOR THE FIRST 6 MONTHS OF PUMPING, IN ORDER TO FACILITATE REMOVAL OF THE AQUIFER STORAGE. THE FLOW COULD BE DECREASED WITH TIME AS AQUIFER STORAGE IS REMOVED.

GROUND WATER PUMPING TO INTERCEPT A PLUME OR LOWER THE WATER TABLE IS TECHNICALLY FEASIBLE AND WIDELY USED. THIS SYSTEM WOULD LOWER THE WATER TABLE, REDUCE DISCHARGE OF CONTAMINATED GROUND WATER TO HOLLY RUN, AND REDUCE MIGRATION OF THE PLUME OFF-SITE IN THE FOX CHASE II AREA.

THE WELLS ARE TO BE CONSTRUCTED OF 10-INCH DIAMETER CASING AND INSTALLED IN AN 18-INCH DIAMETER, GRAVEL PACKED BOREHOLE. IN ORDER TO INSTALL AN EFFICIENT WELL, THE BORING SHOULD BE MADE BY A BUCKET AUGER OR REVERSE CIRCULATION DRILLING METHOD. THE PUMPS WILL BE SUBMERSIBLE AND DESIGNED AT A RATING OF AT LEAST 30 GPM EACH. FLOAT-ACTIVATED ON/OFF SWITCHES WOULD START THE PUMPS WHEN THE WATER TABLE ROSE AND THEN SHUT OFF IN TIMES OF DEPRESSED WATER TABLES. TO ADJUST PUMPING RATES, THE PUMPS WOULD BE EQUIPPED WITH VALVES.

GROUND WATER PUMPING WILL LOWER THE WATER TABLE AT HOLLY RUN. IN ADDITION, THIS ALTERNATIVE WILL INTERCEPT SOME OF THE LEACHATE PLUME AND DECREASE THE RATE OF MIGRATION OF THE PLUME. SINCE MOST OF THE CONTAMINANTS ARE IN SOLUTION, AS OPPOSED TO PRECIPITATED CONTAMINANTS THAT BOND TO THE SOIL, THE CONTAMINANTS WOULD BE REMOVED THROUGH GROUND WATER COLLECTION. GROUND WATER TREATMENT COMBINED WITH SURFACE WATER CONTROL MEASURES WOULD BE EXPECTED TO MEET THE OBJECTIVES OF THE IRM BECAUSE THE CONTAMINANTS ENTERING THE STREAM WOULD BE REMOVED FROM THE ENVIRONMENT THROUGH GROUND WATER TREATMENT.

INSTALLATION OF GROUND WATER PUMPING WELLS WOULD ONLY RELEASE VOCS TO THE IMMEDIATE VICINITY OF THE WELL AND

ONLY DURING CONSTRUCTION. THESE GASES WOULD BE EXPECTED TO DISSIPATE WITHIN A FEW FEET OF THE WELL AND WOULD NOT PRESENT ANY THREAT TO THE RESIDENTS NEARBY. THE RELEASES MAY REQUIRE THE WORKERS TO WEAR RESPIRATORY PROTECTION.

THERE ARE NO TECHNICAL CONSTRAINTS ASSOCIATED WITH THE INSTALLATION OF GROUND WATER PUMPING WELLS. THE WELLS AND PUMPING TESTS WOULD REQUIRE STATE PERMITS.

THE ESTIMATED COST TO INSTALL THE FIVE WELLS AND THEIR ASSOCIATED MATERIALS (PIPE, VALVES, ETC.) WOULD BE $139,000. ANNUAL OPERATION AND MAINTENANCE COSTS FOR THE WELLS AND PUMPS ARE ESTIMATED AT $1,100 PER YEAR. THESE COSTS ARE IN ADDITION TO THE CAPITAL AND O&M COSTS FOR TREATMENT AND SURFACE WATER CONTROL.

LONG TERM REMEDIAL ACTION

THE FFS ADDRESSED APPROPRIATE REMEDIAL ACTIONS ONLY FOR THE HOLLY RUN AND FOX CHASE II AREA. THE DRAFT FEASIBILITY STUDY DATED JULY, 1985 EVALUATES THE REMEDIAL ACTION ALTERNATIVES FOR THE ENTIRE SITE INCLUDING THE HOLLY RUN AND FOX CHASE II AREA.

SCREENING REMEDIAL ALTERNATIVE TECHNOLOGIES

TABLE A SUMMARIZES THE PROBLEMS POSED BY CONDITIONS AT THE SITE AND PATHWAYS OF MIGRATION IDENTIFIED DURING THE REMEDIAL INVESTIGATION. THE GOAL OF THE REMEDIAL ACTION AT THE GEMS LANDFILL IS TO PREVENT OR MITIGATE THE RELEASE OF HAZARDOUS SUBSTANCES OUTLINED IN THIS TABLE.

A COMPREHENSIVE LIST OF REMEDIAL TECHNOLOGIES GENERALLY APPLICABLE TO UNCONTROLLED HAZARDOUS WASTE SITES WAS EVALUATED. THIS SCREENING PROCEDURE EVALUATED THE TECHNOLOGICAL APPLICABILITY AND CONSTRAINTS, PUBLIC HEALTH AND ENVIRONMENTAL EFFECTS, INSTITUTIONAL CONSTRAINTS, AND ORDER OF MAGNITUDE COSTS. THE RESULTS OF THE SCREENING IDENTIFIED FEASIBLE REMEDIAL ACTION TECHNOLOGIES THAT WERE THE BASIS OF THE REMEDIAL ALTERNATIVE COMPONENTS.

REMEDIAL ALTERNATIVE COMPONENTS

CAPPING

INSTALLING A CAP AT THIS SITE WILL REDUCE THE AMOUNT OF LEACHATE BEING PRODUCED, PRIMARILY BY RESTRICTING THE AMOUNT OF RAINFALL THAT PERCOLATES THROUGH THE DEPOSITED WASTES. THIS IN TURN WOULD BE EXPECTED TO REDUCE THE CONTAMINATION IN THE GROUND AND SURFACE WATERS BY THE LEACHATE. A CAP WOULD ALSO SUBSTANTIALLY REDUCE THE DIRECT CONTACT HAZARDS ASSOCIATED WITH THE LEACHATE AND EXPOSED WASTE AS WELL AS THE INHALATION HAZARDS FROM THE SURFACE LEACHATE SEEPS. CAPPING IS A PROVEN TECHNOLOGY AND IS WIDELY USED AT SANITARY AND HAZARDOUS WASTE LANDFILLS.

SEVERAL MATERIALS ARE AVAILABLE FOR USE AS A CAPPING MATERIAL. THESE INCLUDE SYNTHETIC MEMBRANES, CLAY, SOIL, ASPHALT, CONCRETE, CHEMICAL SEALANTS/STABILIZERS, AND MULTIMEDIA (COMBINATION OF MATERIALS). ASPHALT, CONCRETE, AND CHEMICAL SEALANTS WERE ELIMINATED IN THE INITIAL SCREENING DUE TO THE LIKELIHOOD OF CRACKING (LOW PERMEABILITY) AS A RESULT OF DIFFERENTIAL SETTLING WHICH IS EXPECTED AT THE GEMS SITE. THE MATERIALS RETAINED FOR USE IN THE CAP ARE CLAY, SOIL AND SYNTHETIC LINERS, OR A VARIETY OF COMBINATIONS OR MULTIMEDIA CAPS.

THE MULTIMEDIA CAP PROPOSED FOR THE GEMS SITE CONSISTS OF:

- 6 INCHES OF TOPSOIL
- 18 INCHES OF SOIL
- FILTER FABRIC
- 12 INCHES OF SAND/GRAVEL (DRAINAGE LAYER)
- 30 MIL SYNTHETIC MEMBRANE
- 24 INCHES OF CLAY
- FILTER FABRIC
- 12 INCHES GRAVEL (GAS COLLECTION LAYER)

- FILTER FABRIC.

THIS CAP CONFORMS TO FINAL COVER GUIDANCE DEVELOPED UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA). IF PROPERLY INSTALLED AND MAINTAINED, THE CAP ESSENTIALLY ELIMINATES INFILTRATION OF RAIN WATER. THEREFORE, THE AMOUNT OF LEACHATE GENERATED WOULD BE SUBSTANTIALLY REDUCED. HOWEVER, THERE ARE TECHNICAL LIMITATIONS TO CONSTRUCTION OF THIS TYPE OF CAP AT THIS SITE. THE RCRA GUIDANCE RECOMMENDS THE SLOPE OF THE CAP OVER THE WASTE TO BE A MAXIMUM OF 3-5%. THE TOP OF THE GEMS LANDFILL CAN EASILY BE REGRADED TO THIS SLOPE. HOWEVER, THE SIDE SLOPES OF THE SITE ARE CURRENTLY GREATER THAN 33%. REGRADING THE SIDE SLOPES TO 5% IS TECHNICALLY IMPRACTICAL DUE TO THE AREA NEEDED TO EXPAND THE LANDFILL AND THE AMOUNT OF SOIL NEEDED TO FILL THE GRADE UP TO 5%. EVEN THOUGH THIS TYPE OF CAP IS NOT FEASIBLE FOR THE SIDE SLOPES OF THE SITE, IT CAN BE USED ON THE TOP OF THE LANDFILL.

THE MAXIMUM SIDE SLOPE FOR CAPS IS GENERALLY ACCEPTED TO BE 3:1 TO ENSURE RELIABILITY. IN ORDER TO ACHIEVE A 3:1 SLOPE AT THE SITE, THE EXISTING WASTE WOULD NEED TO BE REGRADED OR FILL MATERIAL WOULD HAVE TO BE ADDED OVER THE WASTE. BOTH METHODS ARE TECHNICALLY FEASIBLE AND, ONCE COMPLETED, WOULD ENSURE THE RELIABILITY OF THE CAP AGAINST SLOPE FAILURE.

SOIL IS A VIABLE CAP MATERIAL IN THAT IT DOES REDUCE LEACHATE GENERATION AND IS THE LEAST EXPENSIVE ALTERNATIVE. A 30 INCH CLAYEY SOIL PLACED OVER THE WASTE AND/OR FILL MATERIAL WITH A 6 INCH TOP SOIL IS ENVISIONED AS THE SOIL CAP FOR THE GEMS SITE. INSTALLATION OF A SOIL CAP IS TECHNICALLY FEASIBLE ON A 3:1 SLOPE AND EASILY IMPLEMENTABLE. THE EASY INSTALLATION OF THE SOIL CAP AND ITS LOW COST RELATIVE TO OTHER CAPS ARE THE ADVANTAGES TO THE SOIL CAP. HOWEVER, THE SOIL CAP PROVIDES THE LOWEST REDUCTION IN LEACHATE GENERATION.

ANOTHER CAPPING ALTERNATIVE IS TO ADD A CLAY TO THE SOIL CAP. IT WOULD CONSIST OF A GRAVEL GAS COLLECTION LAYER, 2 FEET OF CLAY, A SAND DRAINAGE LAYER AND 2 FEET OF SOIL AND TOPSOIL. THIS CAP SIGNIFICANTLY REDUCES LEACHATE GENERATION OVER THE SOIL CAP, ALTHOUGH NOT AS MUCH AS THE MULTIMEDIA CAP. THE TIME NEEDED TO INSTALL THE CLAY CAP IS GREATER THAN THE SOIL CAP, BUT LESS THAN THE MULTIMEDIA CAP. THE COST IS ALSO GREATER THAN THE SOIL CAP BUT LESS THAN THE MULTIMEDIA. A CLAY CAP IS TECHNICALLY FEASIBLE TO CONSTRUCT ON A 3:1 SLOPE AND EFFECTIVELY REDUCES LEACHATE GENERATION.

THE ADVANTAGE OF REGRADING THE EXISTING WASTE, RATHER THAN ADDING FILL, IS A LOWER COST AND SHORTER CONSTRUCTION TIME. THE DRAWBACK OF REGRADING THE WASTE IS THE POTENTIAL SHORT TERM ADVERSE EFFECTS FROM EXPOSING IT. EXPOSING AND CUTTING INTO THE WASTE COULD INCREASE THE AIR EMISSIONS FROM THE SITE POSING A HAZARD TO WORKERS AND NEARBY RESIDENTS. HAZARDOUS WASTE CONTAINERS BURIED AT THE SITE COULD ALSO BE ENCOUNTERED AND MAY POSE HAZARDS TO THE WORKERS SHOULD THEY BE RUPTURED. IT IS POSSIBLE TO LIMIT THE POTENTIAL SHORT TERM ADVERSE IMPACTS THROUGH CAREFUL CONSTRUCTION TECHNIQUES AND PROPER PRECAUTIONARY MEASURES. LIMITING THE AREA OF THE OPEN FACE ALLOWS FOR CONTROLLING ANY EMISSIONS DETECTED BY MONITORING INSTRUMENTS.

MATERIAL TO CONTROL OR ELIMINATE EMISSIONS CAN BE ON-HAND AND QUICKLY AND EASILY APPLIED OVER THE OPEN WORKING FACE. ALTHOUGH ENCOUNTERING AND POSSIBLY RUPTURING HAZARDOUS WASTE CONTAINERS WITH HEAVY EQUIPMENT ALWAYS PRESENTS AN UNKNOWN HAZARD, UNCOVERING THESE CONTAINERS ALSO ALLOWS FOR THEIR REMOVAL AND PROPER DISPOSAL BEFORE THE MATERIAL CAN LEAK AND FLOW INTO THE GROUND WATER.

ADDING FILL TO THE EXISTING SIDE SLOPES TO BRING THEM TO A 3:1 SLOPE WOULD BE MORE COSTLY AND TIME CONSUMING THAN REGRADING THE FILL. IT WOULD NOT PRESENT THE SAME POTENTIAL SHORT TERM ADVERSE EFFECTS, BUT DUE TO THE LONGER CONSTRUCTION TIME, THE EXISTING HAZARD WOULD NOT BE REMEDIATED AS QUICKLY.

THE COST DIFFERENCE OF THE SLOPE OPTIONS ARE WITHIN AN ORDER OF MAGNITUDE AND EACH OPTION HAS BENEFICIAL AND ADVERSE IMPACTS, THEREFORE, BOTH ARE CONSIDERED FOR INCLUSION IN THE REMEDIAL ALTERNATIVES.

IN ORDER TO ENSURE THE RELIABILITY OF ALL THE CAP ALTERNATIVES, A GAS VENTING SYSTEM AND RUNOFF CONTROL SYSTEM HAVE TO BE IMPLEMENTED. ONCE THE LANDFILL IS COVERED, THE AMOUNT OF GAS PRODUCED IS EXPECTED TO INCREASE SIGNIFICANTLY DUE TO INCREASED PRESSURE AND TEMPERATURE. PRESSURE WOULD THEN CONTINUE TO BUILD UP AND COULD RUPTURE THE CAP, UNLESS RELIEVED. RUNOFF CONTROLS ARE NECESSARY TO PREVENT EROSION OF THE CAP MATERIAL. ALL THE CAPS WILL BE VEGETATED TO REDUCE EROSION.

GAS COLLECTION/TREATMENT

TWO TYPES OF GAS COLLECTION SYSTEMS WERE EVALUATED; PASSIVE GAS VENTILATION AND ACTIVE GAS COLLECTION AND TREATMENT. THE PASSIVE GAS VENTILATION SYSTEM WAS ELIMINATED IN THE INITIAL SCREENING DUE TO A HIGH POTENTIAL FOR FAILURE AFTER INSTALLATION. DIFFERENTIAL SETTLING COULD CAUSE POCKETS OF GAS TO BE FORMED IN AREAS ISOLATED FROM A PASSIVE VENT. THESE POCKETS COULD CAUSE PRESSURE BUILD-UP SUFFICIENT TO RUPTURE THE CAP. THE OFF-SITE MIGRATION OF METHANE AND THE POTENTIAL FOR METHANE TO COLLECT IN BASEMENTS WOULD MOST LIKELY REQUIRE THAT AN ACTIVE GAS COLLECTION SYSTEM, RATHER THAN A PASSIVE GAS VENTING SYSTEM, BE INSTALLED UNDER NEW JERSEY SOLID WASTE REGULATIONS.

AN ACTIVE GAS COLLECTION AND TREATMENT SYSTEM WOULD SIGNIFICANTLY REDUCE THE POTENTIAL FOR GAS POCKETS TO FORM. THE COLLECTION SYSTEM CREATES A NEGATIVE PRESSURE UNDER THE CAP. POCKETS FORMED BY DIFFERENTIAL SETTLEMENT WOULD NOT IMPEDE THE GAS FROM MIGRATING TOWARD THE POINT OF NEGATIVE PRESSURE, THE GAS COLLECTION WELLS.

AMBIENT AIR SAMPLES COLLECTED IN SEPTEMBER, 1983 BY NUS IDENTIFY THE ORGANIC CHEMICAL CONSTITUENTS AND CONCENTRATIONS OF THE GASES EMANATING MAINLY FROM THE LANDFILL. THE RISKS ASSOCIATED WITH THE MINIMUM CONCENTRATIONS OF THE VOLATILE ORGANIC COMPOUNDS ARE BELIEVED TO NECESSITATE TREATMENT OF THE LANDFILL GASES. THREE TYPES OF TREATMENT FOR THE GASES WERE EVALUATED: ACTIVATED CARBON, FLARING, AND INCINERATION. INCINERATION WAS ELIMINATED SINCE IT IS CONSIDERED TO BE IN THE DEVELOPMENTAL STAGE WHEN APPLIED TO LANDFILL GASES, AND COULD INVOLVE A LARGE CAPITAL EXPENSE.

VAPOR PHASE ACTIVATED CARBON IS A PROVEN TECHNOLOGY FOR REMOVING TRACE ORGANIC CHEMICALS FROM GASES. TREATMENT OF THE LANDFILL GAS WITH ACTIVATED CARBON WOULD SUBSTANTIALLY REDUCE THE HUMAN HEALTH RISK ASSOCIATED WITH THE LANDFILL GAS. ACTIVATED CARBON WOULD NOT REMOVE THE METHANE, AND THE POTENTIAL ADVERSE ENVIRONMENTAL PROBLEM ASSOCIATED WITH THE DISCHARGE OF LARGE AMOUNTS OF HYDROCARBONS TO THE ATMOSPHERE WOULD REMAIN.

FLARING THE GAS WOULD EFFECTIVELY DESTROY THE METHANE BUT MAY NOT DESTROY THE ORGANIC CHEMICALS AND MAY PRODUCE TOXIC COMPOUNDS FROM INCOMPLETE COMBUSTION.

THE COMBINATION OF ACTIVATED CARBON FOLLOWED BY FLARING EFFECTIVELY REDUCES BOTH THE HUMAN AND ENVIRONMENTAL IMPACTS FROM THE LANDFILL GAS.

SURFACE WATER DIVERSION

SURFACE WATER DIVERSION AT THE GEMS SITE WOULD PRIMARILY INVOLVE STORM WATER RUNOFF CONTROLS. WHEN USED IN CONJUNCTION WITH A CAP, IT IS NECESSARY TO CONTROL EROSION AND ENSURE THE RELIABILITY OF THE CAP. FACILITATING STORM WATER RUNOFF REDUCES THE AMOUNT OF WATER AVAILABLE FOR PERCOLATION AND SUBSEQUENT LEACHATE GENERATION.

SINCE SURFACE WATER CONTROLS ALONE DO NOT SIGNIFICANTLY REDUCE LEACHATE GENERATION, THIS COMPONENT WILL BE RETAINED TO BE USED IN CONJUNCTION WITH CAPPING.

FOR THIS SITE, SURFACE WATER CONTROLS, IMPLEMENTED IN CONJUNCTION WITH A CAP, WOULD INVOLVE COLLECTION CHANNELS ON THE CAP LEADING TO SEDIMENTATION BASINS AND CHANNELS TO LOCAL SURFACE WATERS. THE SEDIMENTATION BASINS ARE ESSENTIAL IN PROTECTING THE STREAMS SINCE THE EROSION POTENTIAL DURING CONSTRUCTION OF THE CAP IS HIGH UNTIL IT CAN BE VEGETATED.

THE EXISTING COURSE OF HOLLY RUN IS CAUSING ADVERSE IMPACTS IN RELATION TO STORM WATER RUNOFF. HOLLY RUN IS ERODING THE SOIL AT THE BASE OF THE NORTHEAST SIDE OF THE LANDFILL, AND HAS FLOODED AN AREA JUST UPSTREAM OF THE FOX CHASE II DEVELOPMENT. THE FLOODING IS BELIEVED TO BE THE PRIMARY CAUSE OF THE DEAD VEGETATION. THIS SITUATION WOULD BE AGGRAVATED WITH THE INCREASED RUNOFF FROM THE CAP. IT APPEARS NECESSARY TO RELOCATE HOLLY RUN IN ORDER TO AVOID EROSION AT THE BASE OF THE LANDFILL AND TO FACILITATE PROPER STORM WATER RUNOFF.

TOE DRAIN

A TOE DRAIN INSTALLED AT THE BASE OF THE LANDFILL WOULD COLLECT ANY LEACHATE MIGRATING LATERALLY ABOVE THE LEVEL OF THE DRAIN FROM THE LANDFILL INTO THE SURROUNDING SOIL OR BREAKING OUT ON THE SIDE SLOPES. THE TOE DRAIN WOULD BE INTEGRATED INTO A GRAVEL FOUNDATION FOR THE CAP. THE DRAIN WOULD ENCOMPASS THE ENTIRE SITE. THE GRAVEL FOUNDATION COULD ALSO HELP CONTROL LATERAL MIGRATION OF GASES.

GROUND WATER PUMPING

IN ORDER TO CONTROL THE OFF-SITE MIGRATION OF CONTAMINANTS IN THE GROUND WATER AND THE DISCHARGE OF CONTAMINATED GROUND WATER INTO HOLLY RUN, GROUND WATER CONTROL IS NECESSARY. TWO TECHNOLOGIES TO CONTROL GROUND WATER MIGRATION WERE EVALUATED: GROUND WATER BARRIERS AND GROUND WATER PUMPING. THE GROUND WATER BARRIERS WERE ELIMINATED IN THE INITIAL SCREENING. BARRIERS ARE EFFECTIVE IN CONTAINING GROUND WATER WHEN THEY ARE KEYED INTO AN IMPERMEABLE BASE. THE ONLY ADEQUATE BASE AT THE SITE IS THE MANASQUAN FORMATION WHICH IS APPROXIMATELY 140 FEET BELOW THE GROUND SURFACE. THIS DEPTH IS CONSIDERED TO BE TOO GREAT TO RELIABLY INSTALL A BARRIER.

GROUND WATER PUMPING CAN EFFECTIVELY AND RELIABLY CONTROL THE OFF-SITE MIGRATION OF CONTAMINATED GROUND WATER FROM THE SITE. IT IS A PROVEN TECHNOLOGY AND HAS RELATIVELY LOW ADVERSE ENVIRONMENTAL IMPACTS. A GROUND WATER PUMPING SYSTEM CAN BE EASILY IMPLEMENTED IN A RELATIVELY SHORT TIME.

THE GROUND WATER PUMPING SYSTEM ENVISIONED UTILIZES 24 PUMPING WELLS SURROUNDING THE SITE. THE PUMPING SYSTEM WOULD BE DESIGNED TO ACCOMPLISH TWO IMPORTANT GOALS. ONE IS TO STOP THE GENERATION OF LEACHATE FROM THE WASTE THAT IS IN CONTACT WITH THE GROUND WATER. THE OTHER IS TO STOP THE MIGRATION OF THE CONTAMINANT PLUME. TO ENSURE THAT GROUND WATER IS NO LONGER CONTACTING THE WASTE, THE WATER TABLE MUST BE LOWERED UNDER THE LANDFILL BY APPROXIMATELY 25 FEET. THROUGH THE USE OF A COMPUTER PROGRAM, IT WAS ESTIMATED THAT A COMBINED PUMPING RATE OF 183 GPM WOULD BE NECESSARY TO MAINTAIN A CONE OF DEPRESSION OF 25 FEET BELOW THE ENTIRE LANDFILL. THIS CONE OF DEPRESSION ALSO EXTENDS OUT FROM THE SITE AND REVERSES THE FLOW DIRECTION OF THE CONTAMINANT PLUME AND DRAWS IT BACK TO THE PUMPING/COLLECTION SYSTEM. THE INITIAL FLOW RATE WOULD BE GREATER THAN 183 GPM TO REMOVE AQUIFER STORAGE AND CREATE THE CONE OF DEPRESSION.

THIS PUMPING SYSTEM WOULD ALSO PREVENT GROUND WATER, BOTH CONTAMINATED AND UNCONTAMINATED, FROM DISCHARGING TO HOLLY RUN. ALTHOUGH PREVENTING CONTAMINATED GROUND WATER FROM ENTERING HOLLY RUN IS BENEFICIAL, THE PUMPING SYSTEM MAY DRY UP HOLLY RUN BY DEPRIVING IT OF RECHARGE FROM THE GROUND WATER SYSTEM.

GROUND WATER TREATMENT (AQUEOUS WASTE TREATMENT)

AFTER THE GROUND WATER IS COLLECTED IN THE PUMPING SYSTEM, IT WILL NEED TO BE TREATED PRIOR TO ITS ULTIMATE DISCHARGE TO SURFACE WATER.

SEVERAL TREATMENT TECHNOLOGIES WERE EVALUATED. BASED ON THE TREATABILITY STUDIES PREVIOUSLY CONDUCTED, WHICH INDICATED THAT THE GROUND WATER CAN BE EFFECTIVELY TREATED WITH AIR STRIPPING AND ACTIVATED SLUDGE, THE PREFERRED TREATMENT APPROACH IS ON-SITE PRETREATMENT AND DISCHARGE TO THE LOCAL POTW.

THE ON-SITE PRETREATMENT SYSTEM IS ENVISIONED TO CONTAIN PRIMARY SETTLING/STABILIZATION, PH ADJUSTMENT, FLOCCULATION AND CLARIFICATION, AND AIR STRIPPING. THE EFFLUENT FROM THE AIR STRIPPER WOULD THEN BE DISCHARGED TO THE POTW FOR FINAL TREATMENT.

THE TREATABILITY STUDIES PREVIOUSLY CONDUCTED FOR GROUND WATER AT THE GEMS SITE INDICATE THAT, AT A DESIGN FLOW OF 60 GPM, THIS PRETREATMENT SYSTEM SHOULD PRODUCE AN EFFLUENT THAT DOES NOT PRESENT ANY INHIBITORY OR TOXIC EFFECTS TO THE POTW. HOWEVER, THE GROUND WATER SYSTEM FOR THE LONG TERM REMEDY IS BELIEVED TO HAVE A DESIGN FLOW GREATER THAN 180 GPM. THE THREE-FOLD INCREASE IN FLOW WILL PROBABLY NECESSITATE ADDITIONAL TREATABILITY STUDIES TO REEVALUATE PRETREATMENT AND FULL ON-SITE TREATMENT SYSTEMS.

SHOULD THE FURTHER TREATABILITY STUDIES OR PHYSICAL OR INSTITUTIONAL CONSTRAINTS PRECLUDE THE IMPLEMENTATION OF THE PREFERRED PRETREATMENT SYSTEM, A COMPLETE ON-SITE TREATMENT SYSTEM WOULD BE CONSIDERED. THIS SYSTEM WOULD INCLUDE AN ACTIVATED SLUDGE TREATMENT UNIT, SECONDARY CLARIFICATION, SAND FILTRATION, AND CARBON ADSORPTION. THE EFFLUENT FROM THE CARBON ADSORPTION UNIT WOULD THEN BE DISCHARGED TO NEARBY SURFACE WATERS.

HOLLY RUN AND BRIAR LAKE REMEDIATION

THE CONTAMINANTS IN HOLLY RUN ARE BELIEVED TO PRESENT POTENTIAL ADVERSE HEALTH IMPACTS FROM DIRECT CONTACT, ACCIDENTAL INGESTION AND INHALATION OF VOLATILIZED CONTAMINANTS. THE COMBINATION OF A CAP AND A GROUND WATER PUMPING SYSTEM WOULD ESSENTIALLY ELIMINATE THE CONTAMINATION OF THE WATER IN HOLLY RUN AND BRIAR LAKE AND, THEREFORE, NO DIRECT REMEDIATION OF THE WATER WOULD BE NECESSARY. THE CONTAMINATED SEDIMENTS HOWEVER WOULD REMAIN, AS WOULD THE POTENTIAL FOR MIGRATION. THE PROPOSED HOLLY RUN AND BRIAR LAKE REMEDIATION WOULD INVOLVE EXCAVATING THE CONTAMINATED SEDIMENTS AND PLACING THEM UNDER THE CAP. THE EXCAVATED AREA WOULD BE REGRADED AND LINED WITH CRUSHED STONE, AND HOLLY RUN WOULD BE INTEGRATED INTO THE STORM RUNOFF CONTROL SYSTEM. IT IS CURRENTLY ESTIMATED THAT SEDIMENT EXCAVATION WILL BE NECESSARY BEYOND BRIAR LAKE.

EXCAVATION

THIS REMEDIAL TECHNOLOGY IS A COMMON CONSTRUCTION TECHNIQUE. APPLYING THIS TECHNOLOGY TO THE GEMS SITE WOULD INVOLVE EXCAVATING THE ENTIRE LANDFILL AND DISPOSING OF THE MATERIAL IN AN ON-SITE OR OFF-SITE SECURE LANDFILL. THE COST OF EXCAVATING AND HANDLING AN ESTIMATED SIX MILLION CUBIC YARDS OF WASTE IS SUBSTANTIAL. ALTHOUGH TECHNICALLY FEASIBLE, EXCAVATING THE WASTE WOULD PRESENT THE SAME SAFETY HAZARDS DISCUSSED ABOVE FOR CAPPING EXCEPT THAT THE DURATION OF THE HAZARD WOULD BE AT LEAST TWELVE TIMES LONGER. THE LONG-TERM BENEFIT WOULD BE GREATER DUE TO THE MORE SECURE DISPOSAL SITE.

ON-SITE RCRA LANDFILL

THIS COMPONENT WOULD INVOLVE CONSTRUCTION OF A SECURE HAZARDOUS WASTE LANDFILL CONFORMING TO THE REGULATORY REQUIREMENTS OF RCRA (RCRA LANDFILL). THIS COMPONENT IS DEPENDENT ON EXCAVATION OF THE EXISTING LANDFILL. A RCRA LANDFILL WOULD CONSIST OF A DOUBLE LINER SYSTEM WITH LEAK DETECTION AND LEACHATE COLLECTION AND A RCRA CAP (MULTIMEDIA). THE COST OF THIS COMPONENT IS CONSIDERED AN ORDER OF MAGNITUDE HIGHER THAN OTHER REMEDIAL TECHNOLOGIES. ALTHOUGH TECHNICALLY FEASIBLE, IT WOULD INVOLVE EXTENSIVE TIME FOR CONSTRUCTION AND WOULD BE EXPECTED TO HAVE SEVERE INSTITUTIONAL CONSTRAINTS. THIS REMEDIAL TECHNOLOGY COMPONENT WAS RETAINED IN ACCORDANCE WITH EPA GUIDANCE.

OFF-SITE RCRA LANDFILL

THIS COMPONENT WOULD INVOLVE DISPOSAL OF THE WASTE IN AN EXISTING SECURE HAZARDOUS WASTE FACILITY AFTER EXCAVATION. IT IS EXTREMELY DOUBTFUL THAT THERE ARE SIX MILLION YARDS OF CAPACITY AVAILABLE AT ANY EXISTING SECURE LANDFILL. EVEN IF CAPACITY WERE AVAILABLE, THE COST OF TRANSPORTING AND DISPOSAL OF THE MATERIAL IS ESTIMATED TO BE IN EXCESS OF ONE BILLION DOLLARS. THIS COMPONENT WAS RETAINED IN ACCORDANCE WITH EPA GUIDANCE.

ALTERNATE WATER SUPPLY

THIS INVOLVES PROVIDING AN ALTERNATE WATER SUPPLY TO RESIDENCES THAT ARE POTENTIALLY IMPACTED BY THE CONTAMINATED GROUND WATER AT THE SITE. THIS CAN BE ACCOMPLISHED BY EITHER INSTALLING NEW WELLS IN THE DEEP AQUIFER CONSTRUCTED TO ENSURE NO CROSS CONTAMINATION OR BY CONNECTING THE HOMES TO MUNICIPAL WATER. BASED ON THE EXTENT OF GROUND WATER CONTAMINATION AT THE SITE, IT APPEARS LIKELY THAT APPROXIMATELY SEVEN WELLS ARE POTENTIALLY AFFECTED. THESE WELLS ARE LOCATED ALONG ERIAL ROAD. THE MOST PRUDENT ACTION WOULD BE TO CONNECT THESE HOMES TO THE MUNICIPAL SUPPLY.

REMEDIAL ALTERNATIVES

THE REMEDIAL COMPONENTS ARE COMBINED TO FORM REMEDIAL ACTION ALTERNATIVES. OUTLINED BELOW ARE THE REMEDIAL ACTION ALTERNATIVES DEVELOPED FOR THE GEMS LANDFILL SITE.

ALTERNATIVE #1

- NO ACTION

ALTERNATIVE #2

- NO REMEDIAL ACTION
- MONITORING OF GROUND WATER, SURFACE WATER AND AIR

ALTERNATIVE #3

- SOIL CAP - PARTIAL LANDFILL EXCAVATION TO 3:1 SIDE SLOPES
- CAP FOUNDATION WITH TOE DRAIN
- ACTIVE GAS COLLECTION AND TREATMENT
- SURFACE WATER DIVERSION
- HOLLY RUN AND BRIAR LAKE REMEDIATION

SECURITY FENCE

ALTERNATIVE #4

- MULTIMEDIA CAP - PARTIAL LANDFILL EXCAVATION TO 3:1 SLOPES
- CAP FOUNDATION WITH TOE DRAIN
- ACTIVE GAS COLLECTION AND TREATMENT
- SURFACE WATER DIVERSION
- HOLLY RUN AND BRIAR LAKE REMEDIATION
- SECURITY FENCE

ALTERNATIVE #5

- SOIL CAP - NO EXCAVATION - FILL WITH BORROW TO 3:1 SIDE SLOPES
- CAP FOUNDATION WITH TOE DRAIN
- ACTIVE GAS COLLECTION AND TREATMENT
- SURFACE WATER DIVERSION
- HOLLY RUN AND BRIAR LAKE REMEDIATION
- SECURITY FENCE

ALTERNATIVE #6

- SOIL CAP - EXCAVATION OF SOUTH SIDE AND FILL WITH BORROW ON WEST AND NORTHEAST TO A 3:1 SIDE SLOPE
- CAP FOUNDATION AND TOE DRAIN
- ACTIVE GAS COLLECTION AND TREATMENT
- SURFACE WATER DIVERSION
- HOLLY RUN AND BRIAR LAKE REMEDIATION
- SECURITY FENCE

ALTERNATIVE #7

- GROUND WATER PUMPING AND TREATMENT
- OTHER ACTIONS ARE THE SAME AS ALTERNATIVE #3

ALTERNATIVE #8

- GROUND WATER PUMPING AND TREATMENT
- OTHER ACTIONS ARE THE SAME AS ALTERNATIVE #4

ALTERNATIVE #9

- GROUND WATER PUMPING AND TREATMENT
- OTHER ACTIONS ARE THE SAME AS ALTERNATIVE #5

ALTERNATIVE #10

- GROUND WATER PUMPING AND TREATMENT

- OTHER ACTIONS ARE THE SAME AS ALTERNATIVE #6

ALTERNATIVE #11

- CONSTRUCTION OF AN ON-SITE RCRA LANDFILL
- EXCAVATION OF THE SITE AND BACKFILL
- GROUND WATER PUMPING AND TREATMENT
- ACTIVE GAS COLLECTION AND TREATMENT (RCRA LANDFILL)
- SURFACE WATER DIVERSION
- HOLLY RUN AND BRIAR LAKE REMEDIATION
- SECURITY FENCE
- GROUND WATER MONITORING

ALTERNATIVE #12

- EXCAVATION OF SITE AND BACKFILL
- DISPOSAL IN OFF-SITE RCRA LANDFILL
- GROUND WATER PUMPING AND TREATMENT
- SURFACE WATER DIVERSION (DURING EXCAVATION)
- HOLLY RUN AND BRIAR LAKE REMEDIATION (OFF-SITE DISPOSAL).

#AE
EVALUATION OF ALTERNATIVES

THE NATIONAL OIL AND HAZARDOUS SUBSTANCE CONTINGENCY PLAN (NCP), 40 CFR PART 300, SUBPART F DICTATES A DETAILED EVALUATION OF THE ALTERNATIVES. THE DETAILED ANALYSIS EVALUATES EACH ALTERNATIVE ACCORDING TO ITS:

- PERFORMANCE (EFFECTIVENESS), RELIABILITY AND IMPLEMENTABILITY
- INSTITUTIONAL CONSTRAINTS/ISSUES
- ANY ADVERSE ENVIRONMENTAL OR HEALTH EFFECTS
- COST.

EACH ALTERNATIVE WAS EVALUATED AND COMPARED ON THE FACTORS LISTED ABOVE. THE EVALUATIONS ARE SUMMARIZED BELOW:

ALTERNATIVE #1 - NO ACTION

THIS ALTERNATIVE OBVIOUSLY HAS NO CONSTRAINTS TO IMPLEMENTATION. THE ADVERSE PUBLIC HEALTH AND ENVIRONMENTAL EFFECTS CAUSED BY THE LANDFILL WOULD CONTINUE UNABATED. LEACHATE WOULD CONTINUE TO BE PRODUCED AND FLOW INTO THE GROUND AND SURFACE WATERS. THE PLUME OF GROUND WATER CONTAMINATION WOULD CONTINUE TO MIGRATE FROM THE SITE AND COULD CONTAMINATE RESIDENTIAL WELLS. THE HAZARDS POSED BY THE CONTAMINATION OF HOLLY RUN AND BRIAR LAKE WOULD CONTINUE UNABATED AND PROBABLY MIGRATE FURTHER DOWNSTREAM AND INCREASE THE LIKELIHOOD OF HUMAN CONTACT WITH THE CONTAMINANTS. LANDFILL GASES CONTAINING HAZARDOUS SUBSTANCES WOULD CONTINUE TO BE RELEASED TO THE AMBIENT AIR POSING AN INCREASED RISK TO THE PUBLIC HEALTH AND CONTINUE TO DEGRADE THE OVERALL AIR QUALITY IN THE AREA. PHYSICAL HAZARDS AND THE POTENTIAL FOR FIRES OR EXPLOSIONS WOULD REMAIN, AND THE LIKELIHOOD OF INJURY TO THE PUBLIC AND FIRES WOULD INCREASE WITH TIME.

ALTERNATIVE #2 - NO ACTION WITH MONITORING

THIS ALTERNATIVE WOULD INVOLVE NO REMEDIAL ACTIONS AND WOULD ONLY MONITOR THE AIR, GROUND WATER, SURFACE WATER. THE ADVERSE PUBLIC HEALTH AND ENVIRONMENTAL EFFECTS OF THE LANDFILL WOULD CONTINUE UNABATED AS DISCUSSED IN ALTERNATIVE #1, BUT THE MONITORING WOULD PROVIDE DATA TO DETECT ANY CHANGES IN THE SITE CONDITIONS.

ALTERNATIVES #3, 4, 5, 6

THESE ALTERNATIVES CONTAIN THE SAME BASIC REMEDIAL ACTION COMPONENTS AND VARY ONLY IN THE CAP MATERIAL AND

THE METHOD TO ACHIEVE A 3:1 SIDE SLOPE. THE BASIC REMEDIAL ACTIONS OF THE ALTERNATIVES ARE: CONSTRUCTION OF A LANDFILL CAP, CONSTRUCTION OF A CAP FOUNDATION AND TOE DRAIN, AN ACTIVE GAS COLLECTION AND TREATMENT SYSTEM, SURFACE WATER DIVERSION, HOLLY RUN AND BRIAR LAKE REMEDIATION, AND INSTALLATION OF A SECURITY FENCE.

THE CAP FOUNDATION AND TOE DRAIN ARE RELIABLE AND RELATIVELY EASY TO IMPLEMENT. THE CAP FOUNDATION HELPS TO ENSURE THE RELIABILITY OF THE CAP BY PROVIDING A SOLID FOUNDATION THAT WOULD HELP ENSURE AGAINST SLOPE FAILURE. THE TOE DRAIN WOULD ALLOW ANY LEACHATE MIGRATING LATERALLY TO DRAIN FROM THE FOUNDATION, AND RELIEVE ANY ADVERSE HYDROSTATIC PRESSURE ON THE TOE OF THE CAP. IN THESE ALTERNATIVES, THE LEACHATE COLLECTED IN THE TOE DRAIN WOULD BE TREATED AT THE TREATMENT FACILITY FOR THE PROPOSED HOLLY RUN IRM. THIS MAY REQUIRE CONVERSION OF THE IRM TREATMENT SYSTEM TO A LONG-TERM SYSTEM IF FLOWS IN THE TOE DRAIN WERE SUBSTANTIAL.

INSTITUTIONAL ISSUES ASSOCIATED WITH THE CAP FOUNDATION AND TOE DRAIN WOULD BE SIMILAR TO ANY CONSTRUCTION PROJECT AND ARE NOT EXPECTED TO IMPEDE OR ADVERSELY AFFECT THE IMPLEMENTATION OF THIS ACTION. SUBSTANTIAL FLOWS AND/OR HIGHLY CONTAMINATED LEACHATE FROM THE TOE DRAIN MAY REQUIRE CHANGES IN THE DISCHARGE PERMIT FOR THE PRETREATMENT FACILITY.

EXCAVATION FOR THE CAP FOUNDATION WOULD LIMIT ANY POTENTIAL ADVERSE HEALTH EFFECTS DURING CONSTRUCTION. THE ESTIMATED CAPITAL COST OF THE FOUNDATION AND TOE DRAIN IS APPROXIMATELY $830,000. ANNUAL OPERATION AND MAINTENANCE COSTS ARE CONSIDERED MINIMAL. THE TREATMENT COST OF THE COLLECTED LEACHATE CANNOT BE DETERMINED SINCE THE AMOUNT OF LEACHATE COLLECTED IN THE TOE DRAIN IS NOT PREDICTABLE.

THE ACTIVE GAS COLLECTION AND TREATMENT SYSTEMS INVOLVE THE COMBINATION OF A GRAVEL LAYER OVER THE WASTE AND UNDER THE CAP WITH PERFORATED FLEXIBLE PVC PIPE PLACED IN THE GRAVEL LAYER. THE PIPES ARE THEN CONNECTED TO A HEADER SYSTEM AND BLOWERS WHICH PROVIDE A NEGATIVE PRESSURE UNDER THE CAP AND A POSITIVE PRESSURE TO TRANSMIT THE GASES THROUGH THE TREATMENT SYSTEM. THE TREATMENT SYSTEM WOULD BE LOCATED ON-SITE AND CONSISTS OF ACTIVATED CARBON FOR REMOVAL OF HAZARDOUS VOLATILE ORGANIC CHEMICALS AND FLARING FOR THE METHANE. THIS SYSTEM HAS PROVEN EFFECTIVENESS, IS RELATIVELY EASY TO IMPLEMENT, AND WITH PROPER OPERATION AND MAINTENANCE, IS VERY RELIABLE.

THE GAS COLLECTION AND TREATMENT SYSTEM WOULD MOST LIKELY BE REQUIRED BY NJDEP UNDER ITS SOLID WASTE REGULATIONS DUE TO THE OFF-SITE MIGRATION OF METHANE AND INHERENT POTENTIAL HAZARDS THE METHANE POSES. THE TREATMENT SYSTEM WOULD BE REQUIRED TO MEET THE STATE'S APPLICABLE AIR POLLUTION REGULATIONS. AN AIR DISCHARGE PERMIT IS NOT EXPECTED TO PRESENT ANY ADVERSE CONSTRAINTS ON IMPLEMENTING THIS ACTION.

THE ESTIMATED CAPITAL COST FOR THE ACTIVE GAS COLLECTION AND TREATMENT SYSTEM IS $880,000. THE ESTIMATED ANNUAL O&M COSTS ARE $26,500.

THE SURFACE WATER DIVERSION ACTION FOR THIS ALTERNATIVE INVOLVES EROSION AND SEDIMENTATION CONTROL DURING CONSTRUCTION OF THE CAP. AFTER THE CAP IS IN PLACE, THE SEDIMENTATION BASINS ACT PRIMARILY AS STORM RUNOFF DETENTION BASINS. THESE ACTIONS ARE EASILY IMPLEMENTED, EFFECTIVE AND RELIABLE.

THE RUNOFF AND SEDIMENTATION CONTROLS DURING CONSTRUCTION OF THE CAP ARE EXPECTED TO BE REQUIRED BY LOCAL EROSION CONTROL ORDINANCES.

THE ESTIMATED CAPITAL COST FOR THE SURFACE WATER DIVERSION ACTION IS $283,000. THE ESTIMATED ANNUAL O&M COSTS ARE CONSIDERED MINIMAL.

IN THESE ALTERNATIVES, THE HOLLY RUN AND BRIAR LAKE REMEDIATION CAN BE INTEGRATED INTO THE SURFACE WATER DIVERSION ACTIONS. BRIAR LAKE NOW ACTS AS A SEDIMENTATION BASIN. AFTER EXCAVATION OF THE CONTAMINATED SEDIMENTS IN HOLLY RUN AND BRIAR LAKE, BRIAR LAKE WOULD ACT AS A SECONDARY SEDIMENTATION BASIN, DURING CONSTRUCTION OF THE CAP, TO ENSURE THAT A SIGNIFICANT STORM WOULD NOT CAUSE ANY SUBSTANTIAL SILTATION IN HOLLY RUN OR HOLLY LAKE BELOW BRIAR LAKE. AFTER CONSTRUCTION OF THE CAP, HOLLY RUN AND BRIAR LAKE COULD THEN BE INTEGRATED INTO THE STORM RUNOFF CONTROL SYSTEM. SINCE THESE ALTERNATIVES DO NOT CONTAIN A GROUND WATER PUMPING SYSTEM, CONTAMINATED GROUND WATER WOULD MOST LIKELY CONTINUE TO DISCHARGE TO HOLLY RUN ALTHOUGH THE QUANTITIES AND CONCENTRATIONS OF THE CONTAMINANTS WOULD BE EXPECTED TO DECREASE DUE TO THE CAP. HOLLY RUN WOULD REMAIN A PATHWAY FOR CONTAMINANTS TO MIGRATE OFF-SITE. ANY NEW SEDIMENTS ACCUMULATING IN HOLLY RUN AND

BRIAR LAKE WOULD BECOME CONTAMINATED OVER TIME.

THE HOLLY RUN AND BRIAR LAKE REMEDIATION WOULD INVOLVE COMPLIANCE WITH STREAM ENCROACHMENT AND DREDGING REGULATIONS. IT IS ANTICIPATED THAT THIS ACTION WILL FULLY COMPLY WITH THESE REGULATIONS AND THEREFORE THEY WOULD NOT CONSTITUTE A SIGNIFICANT CONSTRAINT. NO SIGNIFICANT ADVERSE EFFECTS TO PUBLIC HEALTH OR WORKER SAFETY ARE EXPECTED FROM THIS ACTION. PROPER CONTROLS WILL BE INSTITUTED TO ENSURE MINIMAL ADVERSE ENVIRONMENTAL IMPACTS DURING EXCAVATION OF THE SEDIMENTS. THE ESTIMATED CAPITAL COST FOR THIS ACTION IS $300,000. THE ANNUAL O&M COSTS ARE EXPECTED TO BE MINIMAL.

A SECURITY FENCE IS AN EFFECTIVE, RELIABLE AND EASILY IMPLEMENTED ACTION TO PREVENT UNAUTHORIZED ACCESS ONTO THE LANDFILL. THERE ARE NO ADVERSE HEALTH OR SAFETY EFFECTS FOR THIS ACTION. THE COMBINATION OF THE SURFACE WATER DIVERSION, CAP AND SECURITY FENCE ARE LIKELY TO REQUIRE PERMANENT EASEMENTS FROM ADJACENT LANDOWNERS. THIS COULD PRESENT PROBLEMS, IF ADJACENT LANDOWNERS ARE UNCOOPERATIVE.

THESE ALTERNATIVES DO NOT CONTAIN A GROUND WATER/LEACHATE PUMPING AND TREATMENT SYSTEM. THEREFORE, THE PLUME OF CONTAMINATED GROUND WATER WOULD CONTINUE TO MIGRATE FROM THE SITE AND COULD CONTAMINATE RESIDENTIAL WELLS DOWNGRADIENT. ALTHOUGH THE CAP WOULD REDUCE THE AMOUNT OF LEACHATE GENERATED THROUGH PERCOLATION, LEACHATE WOULD BE EXPECTED TO CONTINUE BEING PRODUCED BY THE WASTE THAT IS IN CONTACT WITH THE GROUND WATER. THE CONTAMINANT CONCENTRATIONS WOULD BE EXPECTED TO RENDER THE AQUIFER IN THE AREA UNUSABLE FOR DRINKING WATER. THE COHANSEY/KIRKWOOD AQUIFER WOULD BE CLASSIFIED AS A CLASS II AQUIFER UNDER EPA'S GROUND WATER PROTECTION STRATEGY.

ALTERNATIVE #3 - SOIL CAP - PARTIAL EXCAVATION

THE LANDFILL CAP IN THIS ALTERNATIVE IS COMPOSED OF A 12-INCH GRAVEL LAYER OVER THE WASTE, 30 INCHES OF LOW PERMEABILITY SOIL AND 6 INCHES OF TOPSOIL WITH VEGETATION. THE 3:1 SIDE SLOPES ARE ACHIEVED BY EXCAVATING THE TOP EDGE OF THE LANDFILL AND PLACING THE MATERIAL ON THE TOP OF THE LANDFILL TO BE USED TO BRING THE TOP TO A CROWN WITH A 3% SLOPE.

THE MAJOR BENEFIT TO PARTIAL EXCAVATION IS THAT THE SOLID WASTE PRESENT ON SITE IS REMOVED FROM THE SIDE SLOPES WHERE THE SLOPE IS GREATER THAN 3:1 AND PLACED ON THE TOP OF THE LANDFILL WHERE THERE ARE DEPRESSIONS AND SLOPES LESS THAN 3%. USING EXISTING MATERIAL AND NOT EXTENDING THE AERIAL EXTENT OF THE LANDFILL RESULTS IN SIGNIFICANT COST SAVINGS OVER OTHER CAPPING ALTERNATIVES. THE ESTIMATED CAPITAL COST OF THE CAP FOR ALTERNATIVE #3 IS $8,921,285 WHILE THE ESTIMATED COST OF THE CAP FOR ALTERNATIVE #5 (NO EXCAVATION) IS $20,664,375. THIS IS A COST SAVINGS OF APPROXIMATELY $11,750,000 OR 57%.

THE PRIMARY FUNCTION OF A LANDFILL CAP IS TO REDUCE PERCOLATION OF RAINWATER THROUGH THE WASTE WHICH THEN PRODUCES LEACHATE. IN ORDER TO EVALUATE THE EFFECTIVENESS OF THE VARIOUS CAP ALTERNATIVES, THE HELP MODEL WAS UTILIZED. THIS MODEL IS USED TO COMPARE THE RELATIVE BENEFITS OF EACH CAP. THE MODEL DOES NOT NECESSARILY SHOW THE ACTUAL EFFECTIVENESS THAT COULD BE REALIZED AFTER CONSTRUCTION. BASED ON THE HELP MODEL, THE SOIL CAP WOULD ALLOW FOR 60% OF THE ANNUAL RAINFALL TO INFILTRATE THROUGH THE CAP.

THE PARTIAL LANDFILL EXCAVATION DOES PRESENT AN ADDITIONAL POTENTIAL RISK OVER OTHER ALTERNATIVES DUE TO EXPOSING OF THE WASTE TO THE ATMOSPHERE DURING EXCAVATION. EXCAVATION WOULD MOST LIKELY ENHANCE THE RELEASE OF THE LANDFILL GASES. PROPER PRECAUTIONS AND CONTROLS, SUCH AS LIMITING THE AREA OF WASTE EXPOSED, CONTINUOUS AIR MONITORING, DAILY COVER, AND HAVING EMERGENCY CONTAINMENT EQUIPMENT ON STANDBY, CAN EFFECTIVELY REDUCE THE RISK ASSOCIATED WITH EXCAVATION. THE SOIL CAP WOULD NOT COMPLY WITH RCRA GUIDANCE FOR FINAL COVER SINCE IT DOES NOT CONTAIN ANY CLAY OR A SYNTHETIC LINER.

ALTERNATIVE #4 - MULTIMEDIA CAP - PARTIAL EXCAVATION

THIS ALTERNATIVE IS THE SAME AS ALTERNATIVE #3 EXCEPT THAT A MULTIMEDIA RCRA CAP IS INSTALLED ON ONLY THE TOP OF THE LANDFILL. THIS ALTERNATIVE ATTEMPTS TO COMPLY WITH RCRA FINAL COVER GUIDANCE TO THE EXTENT THAT IS TECHNICALLY PRACTICABLE. THE TOP OF THE LANDFILL IS THE ONLY AREA WHERE THE SLOPE WOULD BE WITHIN THE GUIDANCE. THE 3:1 SIDE SLOPE WOULD HAVE THE SOIL COVER.

THE HELP MODEL ESTIMATES THAT THIS WOULD ALLOW 52% INFILTRATION. THE ADDITION OF THE RCRA CAP REDUCES

INFILTRATION BY ONLY 8% OVER THE COMPLETE SOIL CAP SINCE THE RCRA CAP WOULD ONLY BE PLACED ON TOP OF THE LANDFILL. THE ESTIMATED CAPITAL COST FOR THIS CAP IS $20,347,000 OR 128% MORE THAN ALTERNATIVE #3.

ALTERNATIVE #5 - SOIL CAP - NO EXCAVATION

THIS ALTERNATIVE WOULD NOT EXCAVATE THE TOP EDGE OF THE LANDFILL TO ACHIEVE THE 3:1 SIDE SLOPE, BUT WOULD UTILIZE LOCAL BORROW AS FILL TO INCREASE THE EXISTING SLOPES 3:1. IN THIS ALTERNATIVE, THE BASE OF THE CAP IS EXTENDED OUT AND THE AREA IS THEN FILLED TO BRING THE SLOPES UP TO 3:1. THE TOP OF THE LANDFILL IS ALSO FILLED TO CREATE THE CROWN.

THE ADVANTAGE TO THIS ALTERNATIVE IS THAT IT WOULD NOT PRESENT THE INCREASED POTENTIAL RISK THAT IS ASSOCIATED WITH EXCAVATING THE FILL. THE AMOUNT OF INFILTRATION THROUGH THE FILL WOULD BE ESSENTIALLY THE SAME AS ALTERNATIVE #3 SINCE THE AERIAL EXTENT OF THE WASTE WOULD NOT CHANGE.

THE ESTIMATED CAPITAL COST OF THIS ALTERNATIVE IS $20,664,375. THIS IS APPROXIMATELY THE SAME AS ALTERNATIVE #4 AND ALMOST $12,000,000 MORE THAN ALTERNATIVE #3.

THIS CAPPING ALTERNATIVE WOULD REQUIRE THE CAP TO EXTEND OUT ONTO HICKSTOWN ROAD ON THE SOUTH SIDE OF THE LANDFILL. TO AVOID ENCROACHMENT ON THE ROADWAY, A RETAINING WALL WOULD BE CONSTRUCTED ALONG 1200 FEET OF HICKSTOWN ROAD. THIS STRUCTURE ACCOUNTS FOR APPROXIMATELY $1,000,000 OF THE ESTIMATED CAPITAL COST OF THE CAP. RELOCATING HICKSTOWN ROAD TO ELIMINATE THE RETAINING WALL IS ESTIMATED TO COST $740,000.

ALTERNATIVE #6 - SOIL CAP - EXCAVATE ONLY SOUTH SIDE

THIS ALTERNATIVE WOULD EXCAVATE THE TOP EDGE OF THE SOUTH SIDE ONLY, TO ELIMINATE THE NEED FOR A RETAINING WALL OR RELOCATING HICKSTOWN ROAD. THIS ALTERNATIVE WOULD PRESENT THE POTENTIAL INCREASED RISK ASSOCIATED WITH EXCAVATING THE FILL BUT THE DURATION OF THIS POTENTIAL RISK IS SUBSTANTIALLY LESS THAN ALTERNATIVES #3 & #4 SINCE EXCAVATION WOULD ONLY INVOLVE ONE SIDE OF THE LANDFILL. ALL OTHER ASPECTS OF THIS ALTERNATIVE WOULD BE THE SAME AS ALTERNATIVE #3, EXCEPT THE COST.

THE ESTIMATED CAPITAL COST FOR THE CAP IN THIS ALTERNATIVE IS $16,488,548, WHICH IS $7,567,263 MORE THAN ALTERNATIVE #3 (PARTIAL EXCAVATION ON THREE SIDES) BUT $4,175,827 LESS THAN ALTERNATIVE #5 (NO EXCAVATION).

ALTERNATIVES #7, 8, 9, 10

THESE ALTERNATIVES ARE IDENTICAL TO ALTERNATIVES #3, 4, 5, AND 6, RESPECTIVELY, EXCEPT THAT THEY INCLUDE A GROUND WATER PUMPING AND TREATMENT SYSTEM.

FOR THESE ALTERNATIVES, A GROUND WATER PUMPING SYSTEM, ENVISIONED TO CONSIST OF 24 PUMPING WELLS, WOULD BE IMPLEMENTED TO LOWER THE GROUND WATER TABLE BENEATH THE FILL AND DRAW THE PLUME OF CONTAMINATION BACK TO THE SITE. WITH THE OTHER REMEDIAL ACTION COMPONENTS, THESE ALTERNATIVES WOULD EFFECTIVELY MITIGATE ALL THE ROUTES OF CONTAMINATION TO THE ENVIRONMENT AND SUBSTANTIALLY REDUCE THE THREAT TO PUBLIC HEALTH.

AS PREVIOUSLY DISCUSSED, THE TREATMENT SYSTEM WOULD BE EXPECTED TO COMPLY WITH ALL APPLICABLE REGULATIONS FOR BOTH THE PRETREATMENT AND COMPLETE TREATMENT SYSTEMS. IT IS LIKELY THAT ADDITIONAL TREATABILITY AND COST-EFFECTIVENESS STUDIES WOULD HAVE TO BE PERFORMED TO FINALIZE THE TREATMENT SYSTEM DESIGN.

THE ESTIMATED CAPITAL COST FOR THE GROUND WATER PUMPING AND PRETREATMENT SYSTEM IS $1,382,953 WITH AN ANNUAL O&M COST OF APPROXIMATELY $500,000.

ALTERNATIVE #11 - ON-SITE - RCRA LANDFILL

THIS ALTERNATIVE INVOLVES EXCAVATING THE ENTIRE LANDFILL AND DISPOSING OF THE MATERIAL IN A NEWLY CONSTRUCTED SECURE LANDFILL ADJACENT TO THE SITE. IT WOULD ALSO INVOLVE REMEDIATION OF THE PLUME OF CONTAMINATION AND OF HOLLY RUN AND BRIAR LAKE. THIS ALTERNATIVE WOULD BE MORE EFFECTIVE THAN ALL OTHER PREVIOUSLY DISCUSSED ALTERNATIVES. BY DISPOSING OF THE MATERIAL IN A RCRA LANDFILL, ANY LEACHATE GENERATED WOULD BE EFFECTIVELY CONTROLLED. THE GROUND WATER PUMPING AND TREATMENT SYSTEM COULD BE DEACTIVATED ONCE THE CONTAMINANTS ARE

REMOVED FROM THE GROUND WATER.

THIS ALTERNATIVE WOULD PRESENT THE GREATEST SHORT-TERM PARTIAL RISK DUE TO THE EXCAVATION OF THE ENTIRE LANDFILL.

THE ESTIMATED CAPITAL COST FOR THE ENTIRE ALTERNATIVE IS ESTIMATED TO BE $162,946,000. THIS IS APPROXIMATELY $138,000,000 OR SEVEN TIMES MORE EXPENSIVE THAN THE NEXT MOST EXPENSIVE ALTERNATIVE PREVIOUSLY DISCUSSED.

ALTERNATIVE #12 - OFF-SITE RCRA LANDFILL

THIS ALTERNATIVE IS THE SAME AS ALTERNATIVE #11 EXCEPT THAT IT WOULD DISPOSE OF THE WASTE IN AN OFF-SITE RCRA LANDFILL. THIS ALTERNATIVE SHOULD NOT HAVE ANY GREATER BENEFITS THAN ALTERNATIVE #11. BUT, INSTITUTIONALLY, IT MAY BE MORE IMPLEMENTABLE.

HOWEVER, OTHER CONSTRAINTS SUCH AS THE LACK OF AVAILABLE CAPACITY AT EXISTING OFF-SITE LANDFILLS, AND THE LOGISTICS OF TRANSPORTING 6 MILLION CUBIC YARDS OF MATERIAL, MAY MAKE IT TECHNICALLY INFEASIBLE TO IMPLEMENT THIS ALTERNATIVE.

THE ESTIMATED CAPITAL COST FOR THIS ALTERNATIVE IS $1,500,000,000 (1.5 BILLION).

COST SUMMARY

TABLE B SHOWS THE ESTIMATED CAPITAL AND ANNUAL O&M COSTS FOR ALL THE ALTERNATIVES. THE CAPITAL COSTS RANGE FROM $0.00 (NO ACTION) TO $1.5 BILLION FOR OFF-SITE DISPOSAL. THE MAJORITY OF THE ALTERNATIVES (3 TO 10) RANGE FROM $11.2 MILLION TO $24.2 MILLION. TABLE C SHOWS THE ESTIMATED PRESENT WORTH COSTS OF THE ALTERNATIVES. THESE COSTS RANGE FROM $0.00 (NO ACTION) TO $1.6 BILLION (OFF-SITE DISPOSAL), BUT THE MAJORITY OF THE ALTERNATIVES RANGE FROM $11.2 MILLION TO $27 MILLION.

THE ANNUAL O&M COSTS ON TABLE B FOR ALTERNATIVES 3, 4, 5 AND 6 ARE ALL ESTIMATED TO BE $107,000. IT IS BELIEVED THAT THE ANNUAL O&M WOULD BE EXPECTED TO VARY WITH THE DIFFERENT CAPS. THE VARIATION OF O&M COSTS CANNOT READILY BE QUANTIFIED, AS REFLECTED IN THE TABLE, DUE MAINLY TO THE UNKNOWN EFFECTS FROM DIFFERENTIAL SETTLING ON THE CAP. IT IS ANTICIPATED THAT THE VARIATION IN O&M WOULD NOT BE SIGNIFICANT. ALSO, IN ADDITION TO THE DIFFERENTIAL SETTLING, THE EFFECT OF THE TYPE OF THE CAP ON THE AMOUNT OF GROUND WATER TO BE PUMPED IS NOT REFLECTED IN THE O&M COSTS OF ALTERNATIVES 7, 8, 9, 10. SINCE TREATMENT COSTS ARE FLOW DEPENDENT, THE ANNUAL O&M SHOULD CHANGE WITH CORRESPONDING REDUCTIONS IN INFILTRATION OF THE VARIOUS CAPS. HOWEVER, THE HELP MODEL INDICATES ONLY A 8% CHANGE IN THE INFILTRATION. AN 8% DIFFERENCE IN INFILTRATION WOULD REPRESENT AN EVEN SMALLER PERCENT CHANGE IN THE ESTIMATED PUMPING FLOW. THIS SMALL FLOW CHANGE WOULD NOT BE EXPECTED TO CHANGE THE O&M COSTS SIGNIFICANTLY.

ALTERNATIVES #5 AND #9 (SOIL CAP WITH NO EXCAVATION) HAVE THE HIGHEST CAPITAL COST OF THE CAP ALTERNATIVES, BUT DO NOT HAVE THE HIGHEST PRESENT WORTH COSTS. THIS IS BECAUSE THE CAPITAL COSTS ARE DIVIDED OVER FOUR YEARS (THE EXPECTED CONSTRUCTION DURATION) INSTEAD OF THREE FOR THE OTHER ALTERNATIVES. THIS EXTENSION RESULTS IN THE LOWER PRESENT WORTH COST.

STATE ACTION

THE NJDEP, BASED ON PRELIMINARY INFORMATION DEVELOPED DURING THE FFS, HAS NEARLY COMPLETED THE DETAILED DESIGN OF AN INITIAL REMEDIAL MEASURE (IRM) SIMILAR TO THE RECOMMENDED ACTION IN THE FFS. THE STATE'S ACTION CONSISTS OF RELOCATING HOLLY RUN, PUMPING AND TREATMENT OF THE GROUND WATER, AND SELECTIVE GRADING AND COVER ON THE LANDFILL. THE STATE'S ACTIONS ARE ALMOST IDENTICAL IN SCOPE TO THOSE RECOMMENDED BY EPA EXCEPT FOR THE SELECTIVE GRADING AND COVERING AT THE LANDFILL. THE STATE'S DESIGN ALSO UTILIZES OTHER TECHNIQUES TO ACHIEVE THE SAME CLEANUP GOALS. THESE DIFFERENCES ARE DESCRIBED BELOW.

THE STATE IS USING TWO 60-INCH REINFORCED CONCRETE PIPES (RCP) IN THE RELOCATION OF HOLLY RUN, AS OPPOSED TO THE CHANNEL EPA EVALUATED. BOTH TECHNIQUES ACCOMPLISH THE GOAL OF RELOCATING AND ISOLATING HOLLY RUN, AND THEREFORE WOULD BE TECHNICALLY EQUIVALENT. THE STATE ALSO INTENDS TO INSTALL AN AIR STRIPPING SYSTEM WITH VAPOR PHASE ACTIVATED CARBON FOR GROUNDWATER/LEACHATE TREATMENT. THE ENVISIONED AIR STRIPPING UNITS ARE

SLIGHTLY DIFFERENT IN THAT THEY UTILIZE DIFFERENT DESIGNS TO ALLOW FOR MAINTENANCE OF THE COLUMNS WHILE CONTINUING TO TREAT THE LEACHATE. BOTH ARE CAPABLE OF TREATING 60 GPM AT 32 PPM TVOC. THE CONCEPTUAL DESIGN DIFFERENCES ARE NOT SIGNIFICANT AND THE TWO UNITS ARE CONSIDERED TECHNICALLY EQUIVALENT. THE STATE INTENDS TO PERFORM ON-SITE REGENERATION OF THE CARBON UNITS WHILE EPA EMPLOYS OFF-SITE REGENERATION/DISPOSAL. BOTH TECHNIQUES WILL EFFECTIVELY REMOVE VOCS FROM THE OFF-GAS BUT DIFFER IN THE HANDLING/DISPOSAL OF THE SPENT ACTIVATED CARBON.

THE GROUND WATER PUMPING TECHNIQUES ALSO DIFFER. THE STATE INTENDS TO USE A WELL POINT SYSTEM WHILE EPA WOULD ULTILIZE PUMPING WELLS. WELL POINTS ARE MORE EASILY INSTALLED THAN PUMPING WELLS, BUT GENERALLY PROVIDE LOWER YIELDS AND THEREFORE MORE WELLS POINTS THAN WELLS ARE REQUIRED. BOTH ARE EXPECTED TO ACCOMPLISH THE DESIRED DRAWDOWN NECESSARY TO EFFECTIVELY CONTROL THE GROUND WATER AND ARE CONSIDERED TECHNICALLY EQUIVALENT.

THE MAJOR DIFFERENCE BETWEEN THE ACTIONS PROPOSED BY THE STATE AND EPA IS THE EXTENT OF GRADING AND COVER. EPA RECOMMENDS GRADING FOR SURFACE RUNOFF LIMITED TO THE STUDY AREA. THE STATE INTENDS TO DO SUBSTANTIAL FILLING, GRADING, AND ADDING COVER OVER MUCH OF THE LANDFILL. EPA CONSIDERED ANY EXTENSIVE ACTIONS RELATED TO PROPER CAPPING AND CLOSURE OF THE LANDFILL TO BE BEYOND THE SCOPE OF ITS INITIAL REMEDIAL MEASURE. ACTIONS RELATED TO CAPPING THE ENTIRE LANDFILL ARE CONSIDERED PART OF THE LONG-TERM REMEDIAL ACTION. THE STATE'S SELECTIVE COVER WOULD BE CONSISTENT WITH ALTERNATIVES #5 AND #9, AND TO A LARGE EXTENT WITH ALTERNATIVES #6 AND #10. HOWEVER, THE STATE'S SELECTIVE COVER WOULD BE REMOVED TO A LARGE EXTENT FOR ALTERNATIVES #3, #4, #7 AND #8. THEREFORE, THE STATE'S COVER ACTION WOULD NOT BE TOTALLY CONSISTENT WITH THESE LONG-TERM ALTERNATIVES. THE SELECTIVE COVER IS NOT CONSISTENT WITH ALTERNATIVES #1 AND #2 SINCE CAPPING IS NOT PART OF THOSE ALTERNATIVES, AND FOR ALTERNATIVES #11 AND #12, IT WOULD HAVE TO BE TOTALLY EXCAVATED.

THE STATE OF NEW JERSEY IS CURRENTLY NEARING COMPLETION OF THE DESIGN OF ITS IRM. NJDEP HAS RECENTLY SUBMITTED AN APPLICATION FOR FEDERAL ASSISTANCE TO IMPLEMENT THE IRM. THE NJDEP INTENDS TO BID THE SELECTIVE COVER ACTION PRIOR TO, AND SEPARATELY FROM THE OTHER IRM COMPONENTS. THE IMPLEMENTATION OF THE SELECTIVE COVER PORTION IS EXPECTED TO BEGIN IN DECEMBER, 1985. CONSTRUCTION OF THE REMAINING COMPONENTS SHOULD BEGIN IN JANUARY, 1986 OR FEBRUARY, 1986.

THE ESTIMATED CAPITAL AND FIRST YEAR O&M COSTS FOR THE STATE'S ACTIONS TO RELOCATE HOLLY RUN AND THE GROUNDWATER/LEACHATE COLLECTION AND TREATMENT SYSTEM ARE APPROXIMATELY $960,000.

#CR
COMMUNITY RELATIONS

IN THE SPRING OF 1983, REPRESENTATIVES OF EPA REGION II WENT DOOR TO DOOR TO EXPLAIN AND ANSWER QUESTIONS CONCERNING THE EMERGENCY ACTION TAKEN AT THE GEMS SITE. IN 1983 AND 1984, THE TOWNSHIP OFFICIALS WERE PERIODICALLY UPDATED ON THE PROGRESS OF THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY.

ON APRIL 11, 1985, REPRESENTATIVES OF EPA REGION II WERE AVAILABLE FROM 1:00PM TO 8:00PM TO ANSWER QUESTIONS ON ALL EPA ACTIVITIES AT THE SITE INCLUDING THE FFS. AT APPROXIMATELY 7:00PM, DUE TO THE LARGE NUMBER OF PEOPLE PRESENT, A PUBLIC MEETING FORMAT WAS ESTABLISHED TO ADDRESS AREA RESIDENT'S QUESTIONS. THE STATUS OF THE FFS WAS ANNOUNCED AND THE PUBLIC WAS INFORMED THAT A MEETING TO PRESENT THE RESULTS OF THE FFS WOULD BE FORTHCOMING.

ON MAY 2, 1985, A PUBLIC MEETING WAS HELD AT THE GLOUCESTER TOWNSHIP MUNICIPAL BUILDING TO PRESENT THE FFS. REPRESENTATIVES OF THE REGION DISCUSSED THE FINDINGS OF THE FFS, AND ALONG WITH REPRESENTATIVES OF THE NJDEP, ADDRESSED THE PUBLIC'S QUESTIONS AND COMMENTS. THE COMMENT PERIOD CLOSING DATE OF MAY 17, 1985 WAS ANNOUNCED ALONG WITH THE LOCATIONS OF PUBLIC REPOSITORIES FOR THE FFS. THE COMMENTS RECEIVED ON THE FFS HAVE BEEN INCLUDED IN THE ATTACHED RESPONSIVENESS SUMMARY.

ON AUGUST 2, 1985, THE PUBLIC COMMENT PERIOD FOR THE RI/FS BEGAN. ON AUGUST 19, 1985, A PUBLIC MEETING WAS HELD AT THE GLOUCESTER TOWNSHIP MUNICIPAL BUILDING. THE RESULTS OF THE RI/FS WERE PRESENTED TO APPROXIMATELY 150 PEOPLE IN ATTENDANCE AND ALTERNATIVE 8 WAS IDENTIFIED AS THE REMEDIAL ALTERNATIVE TENTATIVELY RECOMMENDED BY EPA AND NJDEP. SEVERAL COMMENTS AND STATEMENTS PERTAINING TO THE SITE WERE DISCUSSED. THE MAJORITY OF

THE QUESTIONS DEALT WITH ISSUES THAT WERE NOT DIRECTLY RELATED TO THE RI/FS OR THE RECOMMENDED ALTERNATIVE. COMMENTS FROM THE RESIDENTS CONCERNING THE RECOMMENDED ALTERNATIVE WERE FOR THE MOST PART FAVORABLE. THE ATTACHED RESPONSIVENESS SUMMARY ALSO ADDRESSES ALL THE COMMENTS AND QUESTIONS RECEIVED AT THE PUBLIC MEETING, AND DURING THE PUBLIC COMMENT PERIOD.

#RA
RECOMMENDED REMEDIAL ACTION

ACCORDING TO 40 CFR PART 300.68 (J), COST-EFFECTIVE IS DESCRIBED AS THE LOWEST COST ALTERNATIVE THAT IS TECHNICALLY FEASIBLE AND RELIABLE AND WHICH EFFECTIVELY MITIGATES AND MINIMIZES DAMAGES TO AND PROVIDES ADEQUATE PROTECTION OF PUBLIC HEALTH, WELFARE, AND THE ENVIRONMENT.

AN EVALUATION OF THE ALTERNATIVES LEADS TO THE CONCLUSION THE ALTERNATIVE 8, WITH A MODIFICATION, IS THE APPROPRIATE COST-EFFECTIVE REMEDIAL ACTION FOR THE GEMS LANDFILL SITE. THE MODIFICATION RECOMMENDED IS TO ADD TWO FEET OF THE CLAY TO THE SIDE SLOPES. THIS MODIFICATION SUBSTANTIALLY IMPROVES INFILTRATION REDUCTION EFFECTIVENESS. THE HELP MODEL ESTIMATES THAT THIS MODIFICATION WOULD ALLOW 3% INFILTRATION. ALSO, CLAY IS MORE CONSISTENT WITH THE RCRA FINAL COVER GUIDANCE THAN THE SOIL CAP. THE CAPITAL COST FOR ALTERNATIVE #8 WITH THE CLAY CAP MODIFICATION IS $27,365,000.

AN EVALUATION OF THE ALTERNATIVES FOR THE INITIAL REMEDIAL MEASURE LEADS TO THE CONCLUSION THAT ALTERNATIVE B IS MOST APPROPRIATE. SECTION 300.68 OF 40 CFR REQUIRES ALL REMEDIAL ACTIONS AT NATIONAL PRIORITIES LIST SITES BE CONSISTENT WITH THE FINAL REMEDY TO PREVENT OR MITIGATE THE MIGRATION OF A RELEASE OF HAZARDOUS SUBSTANCES TO THE ENVIRONMENT. ALTERNATIVE B IS CONSISTENT WITH ALTERNATIVE 8 AND IS THE COST-EFFECTIVE INITIAL REMEDIAL MEASURE. THE STATE'S PROPOSED ACTION INCLUDING THE RELOCATION OF HOLLY RUN AND THE GROUND WATER COLLECTION/TREATMENT SYSTEM IS TECHNICALLY EQUIVALENT TO ALTERNATIVE B, IS COMPARABLE IN ESTIMATED COST FOR CAPITAL AND ONE YEAR OF OPERATION AND MAINTENANCE, AND IS CONSISTENT WITH THE LONG-TERM REMEDIAL ACTION. THE DEGREE OF CONSISTENCY OF THE STATE'S PROPOSED SELECTIVE GRADING AND COVER WITH THE RECOMMENDED CAP IS CURRENTLY UNKNOWN. UPON COMPLETION OF THE DETAILED DESIGN OF THE RECOMMENDED CAP, A DETERMINATION WILL BE MADE.

THE RECOMMENDED REMEDIAL ACTION FOR THE GEMS LANDFILL SITE INCLUDES:

- CONSTRUCTION OF A LANDFILL CAP. THE CAP WILL CONSIST OF A MULTIMEDIA COVER ON THE TOP OF THE LANDFILL, AND A CLAY CAP ON THE SIDE SLOPES. THE LANDFILL WILL BE PARTIALLY EXCAVATED TO OBTAIN 3:1 SIDE SLOPES

- IMPLEMENTATION OF A GROUND WATER PUMPING SYSTEM TO ADDRESS THE ENTIRE SITE

- IMPLEMENTATION OF A GROUND WATER PUMPING SYSTEM IN THE FOX CHASE II AREA TO ADDRESS THE CONTAMINATION OF HOLLY RUN

- CONSTRUCTION OF A GROUND WATER/LEACHATE TREATMENT SYSTEM TO INITIALLY TREAT THE GROUNDWATER/LEACHATE FROM THE FOX CHASE II AREA, THEN EXPANDED AND UPGRADED PROPERLY TREAT THE GROUND WATER/LEACHATE FROM THE LONG-TERM GROUND WATER PUMPING AND TOE DRAIN SYSTEMS

- SURFACE WATERS CONTROLS INCLUDING INITIALLY RELOCATING AND ISOLATING HOLLY RUN IN THE FOX CHASE II AREA

- HOLLY RUN AND BRIAR LAKE REMEDIATION

- INSTALLATION OF AN ACTIVE GAS COLLECTION AND TREATMENT SYSTEM

- CONSTRUCTION OF A SECURITY FENCE

- IMPLEMENTATION OF A MONITORING SYSTEM

- CONNECTING POTENTIALLY AFFECTED RESIDENCES (APPROXIMATELY SEVEN) TO THE EXISTING MUNICIPAL WATER

SUPPLY

- OPERATION AND MAINTENANCE.

THE IRM EFFECTIVELY REDUCES THE RELEASE OF HAZARDOUS SUBSTANCES INTO BOTH HOLLY RUN AND THE AMBIENT AIR. OBSERVATIONS BY THE NJDEP INDICATE A POTENTIAL FOR CONTAMINANTS TO MIGRATE BEYOND BRIAR LAKE AND OUTSIDE OF THE EXISTING FENCE. THE DATA INDICATES A SIGNIFICANT POTENTIAL HAZARD ASSOCIATED WITH DIRECT CONTACT WITH THE CONTAMINANTS IN HOLLY RUN. THE DATA ALSO INDICATES A SERIOUS THREAT TO THE AQUATIC LIFE IN HOLLY RUN.

THE IRM SIGNIFICANTLY REDUCES THE POTENTIAL FOR THESE EXPOSURES AND IS CONSISTENT WITH THE FINAL REMEDY FOR THE SITE.

THE RECOMMENDED REMEDIAL ACTION SUBSTANTIALLY REDUCES THE AMOUNT OF LEACHATE BEING PRODUCED BY THE INFILTRATION OF PRECIPITATION THROUGH THE CLAY AND MULTIMEDIA CAP. THE HAZARDS POSED BY EXPOSED WASTE AND LEACHATE SEEPS ARE ESSENTIALLY ELIMINATED BY THE CAP, AND BOTH THE ON-SITE AND OFF-SITE HAZARDS POSED BY THE LANDFILL GAS ARE SUBSTANTIALLY REDUCED BY THE ACTIVE GAS VENTILATION SYSTEM. THE GROUND WATER PUMPING SYSTEM WILL LOWER THE WATER TABLE BELOW THE WASTE AND ELIMINATE THIS MECHANISM OF LEACHATE GENERATION. THE PUMPING SYSTEM ALSO EFFECTIVELY CONTROLS ANY OFF-SITE MIGRATION OF CONTAMINANTS IN THE GROUND WATER AND WOULD DRAW THE EXISTING PLUME BACK TO THE SITE. THE PUMPING SYSTEM WILL ELIMINATE THE CONTAMINANT DISCHARGE INTO HOLLY RUN, AND THE HOLLY RUN AND BRIAR LAKE REMEDIATION WILL EFFECTIVELY ELIMINATE THE EXPOSURE TO CONTAMINATED SEDIMENTS. CONNECTING THE RESIDENCES TO THE MUNICIPAL WATER SUPPLY WOULD ELIMINATE THE POTENTIAL HUMAN HEALTH HAZARD ASSOCIATED WITH CONSUMING THE GROUND WATER.

#OEL
CONSISTENCY WITH OTHER ENVIRONMENTAL STATUTES

IT IS INTENDED THAT BOTH THE IRM (ALTERNATIVE B) AND THE LONG-TERM REMEDIAL ACTION (MODIFIED ALTERNATIVE 8) WILL COMPLY WITH ALL RELEVANT STANDARDS, GUIDANCE AND POLICY WITH THE EXCEPTION OF THE RCRA FINAL COVER GUIDANCE.

IN ORDER TO COMPLY WITH DISCHARGE CRITERIA, IT APPEARS THAT THE TREATMENT SYSTEM MAY REQUIRE METALS REMOVAL. THE INCREMENTAL COSTS ARE NOT EXPECTED TO BE SIGNIFICANT ENOUGH TO JUSTIFY FUND-BALANCING. THE OFF-GAS DISCHARGE FROM THE IRM INCLUDES REMOVAL OF THE VOLATILE ORGANICS WHICH COMPLIES WITH STATE REGULATIONS AND GUIDANCE. THE OFF-GAS FROM THE AIR STRIPPING SYSTEM FOR THE LONG-TERM SYSTEM MAY ALSO REQUIRE REMOVAL OF THE VOLATILE ORGANICS. THE INCREASED COSTS ASSOCIATED WITH OFF-GAS TREATMENT WOULD ALSO NOT BE EXPECTED TO BE SIGNIFICANT ENOUGH TO JUSTIFY FUND-BALANCING.

THE LANDFILL CAP IN THE RECOMMENDED ALTERNATIVE IS BELIEVED TO COMPLY WITH THE RCRA LANDFILL COVER CRITERIA LISTED IN 40 CFR 264.310 (A). THE RECOMMENDED CAP DOES NOT COMPLY WITH THE RCRA FINAL COVER GUIDANCE. AS PREVIOUSLY DISCUSSED, THE GUIDANCE RECOMMENDS 3 TO 5% SLOPES. WITH THE 3:1 SLOPES ON THE THE SIDES OF THE LANDFILL, THE RCRA FINAL COVER IS TECHNICALLY IMPRACTICAL TO INSTALL ON THE SIDE SLOPES AT THE GEMS SITE.

OPERABLE UNITS

THE STATE OF NEW JERSEY HAS STATED THAT IT WILL IMPLEMENT ITS IRM WITHIN THE NEXT FEW MONTHS. PORTIONS OF THE STATE'S IRM ARE TECHNICALLY EQUIVALENT AND CONSISTENT WITH THE RECOMMENDED LONG-TERM REMEDIAL ACTION; SPECIFICALLY THE CONSTRUCTION OF A GROUND WATER/LEACHATE COLLECTION AND PRETREATMENT SYSTEM, AND RELOCATION OF A PORTION OF HOLLY RUN. IMPLEMENTATION OF THESE TWO COMPONENTS WOULD ESSENTIALLY CONSTITUTE IMPLEMENTING AN INITIAL PHASE OF THE LONG-TERM REMEDIAL ACTION.

DURING THE DESIGN OF THE LONG-TERM REMEDIAL ACTION, AN EVALUATION TO DETERMINE THE FEASIBILITY OF PHASING THE CONSTRUCTION OF THE SELECTED REMEDY INTO OPERABLE UNITS SHOULD BE CONDUCTED. PHASING OF THE IMPLEMENTATION OF A PROJECT OF THIS MAGNITUDE HAS THE BENEFIT OF POTENTIALLY PROMOTING CONSTRUCTION EFFICIENCY AS WELL AS TO DISTRIBUTING THE PROJECT'S FUNDING REQUIREMENTS OVER THE IMPLEMENTATION DURATION. AN ANALYSIS OF THE EFFECTS OF DIFFERENTIAL SETTLING ON THE CAP SHOULD BE CONDUCTED DURING DESIGN TO ATTEMPT TO PREDICT FURTHER MAINTENANCE NEEDS.

#OM
OPERATION AND MAINTENANCE

THE RECOMMENDED REMEDIAL ACTION WILL REQUIRE A SIGNIFICANT COMMITMENT TO OPERATION AND MAINTENANCE (O&M) OF THE GROUND WATER PUMPING AND TREATMENT SYSTEMS, CAP, SECURITY FENCE, SURFACE WATER CONTROLS, AND THE MONITORING SYSTEM TO ASSURE THE CONTINUED EFFECTIVENESS OF THE REMEDY. O&M REQUIREMENTS WILL BE FURTHER DEFINED DURING THE DESIGN OF THE REMEDIAL ACTION.

#FA
FUTURE ACTIONS

ADDITIONAL STUDIES

IT IS ANTICIPATED THAT, IN ADDITION TO THE EVALUATIONS DISCUSSED IN THE OPERABLE UNITS SECTION, FURTHER STUDIES MAY BE NECESSARY TO PROPERLY DESIGN THE SELECTED REMEDY. THESE STUDIES MAY INCLUDE BUT ARE NOT LIMITED TO; TREATABILITY STUDIES FOR THE GROUND WATER TREATMENT SYSTEM, AND HYDROLOGICAL TESTING TO OPTIMIZE THE PUMPING SYSTEM.

#SCH

SCHEDULE	DATE
EPA ACTION	
- FINAL RECORD OF DECISION	SEPTEMBER 1985
- OBLIGATE FUNDS FOR DESIGN AND INITIAL PHASE (IRM)	PENDING CERCLA REAUTHORIZATION OR STATE ADVANCE MATCH FUNDING
- CONTINUE RESPONSIBLE PARTY SEARCH	ONGOING
STATE ACTION	
- COMPLETE DESIGN FOR SELECTIVE COVER	SEPTEMBER 1985
- COMPLETE DESIGN FOR INITIAL PHASE (IRM)	OCTOBER 1985
- INITIATE LONG-TERM DESIGN	PENDING CERCLA REAUTHORIZATION OR ADVANCE MATCH STATE FUNDING
- IMPLEMENT SELECTIVE COVER	NOVEMBER 1985
- IMPLEMENT INITIAL PHASE (IRM) (GROUNDWATER COLLECTION/TREATMENT)	DECEMBER 1985 - JANUARY 1986
- COMPLETE LONG-TERM DESIGN	PENDING CERCLA REAUTHORIZATION OR ADVANCE MATCH STATE FUNDING.

#TMA
TABLES, MEMORANDA, ATTACHMENTS

ATTACHMENT I

#RS
RESPONSIVENESS SUMMARY
FOR THE
GEMS LANDFILL SITE

GLOUCESTER TOWNSHIP
CAMDEN COUNTY, NEW JERSEY

SEPTEMBER 1985

INTRODUCTION

THIS RESPONSIVENESS SUMMARY FOR THE GEMS LANDFILL SITE OUTLINES KEY COMMUNITY CONCERNS REGARDING THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY REPORT (RI/FS) AND THE PROPOSED REMEDIAL ALTERNATIVES FOR SITE CLEANUP. THESE COMMENTS WILL BE TAKEN INTO CONSIDERATION WHEN THE EPA MAKES ITS FINAL SELECTION OF THE PROPOSED REMEDIAL ACTIONS. THE RESPONSIVENESS SUMMARY IS PREPARED BY EPA TO ADDRESS THESE COMMENTS AND IS INCORPORATED INTO THE RECORD OF DECISION WHICH STATES THE SELECTED REMEDIAL ACTION.

THIS RESPONSIVENESS SUMMARY IS DIVIDED INTO THE FOLLOWING SECTIONS:

SECTION A. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS. THIS SECTION PROVIDES A BRIEF HISTORY OF COMMUNITY INTEREST REVOLVING AROUND THE GEMS LANDFILL SITE AND OF COMMUNITY RELATIONS ACTIVITIES CONDUCTED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA) DURING THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS).

SECTION B. SUMMARY OF MAJOR QUESTIONS AND COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES. THIS SECTION SUMMARIZES MAJOR QUESTIONS AND COMMENTS MADE TO EPA DURING THE PUBLIC MEETING OF AUGUST 19, 1985. COMMENTS WITH THE EPA RESPONSES ARE CATEGORIZED UNDER SEPARATE TOPICS.

SECTION C. REMAINING CONCERNS. THIS SECTION DISCUSSES REMAINING COMMUNITY CONCERNS THAT THE ENVIRONMENTAL PROTECTION AGENCY (EPA) AND THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION (NJDEP) SHOULD BE COGNIZANT OF WHEN PERFORMING THE DESIGN AND CONSTRUCTION PHASE OF THE SELECTED REMEDIAL ALTERNATIVE FOR THE GEMS LANDFILL SITE.

A. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

THE CITIZENS LIVING IN THE VICINITY OF THE GEMS LANDFILL HAVE BEEN AWARE OF THE LANDFILL FOR OVER 20 YEARS. LOCATED IN GLOUCESTER TOWNSHIP, CAMDEN COUNTY, NEW JERSEY, THE SITE CONSISTS OF APPROXIMATELY 60 ACRES AT THE INTERSECTION OF ERIAL AND HICKSTOWN ROADS. LANDFILL OPERATIONS CEASED IN NOVEMBER 1980, AND IN SEPTEMBER 1983, THE GEMS LANDFILL SITE WAS INCLUDED ON THE NATIONAL PRIORITIES LIST (NPL).

A REMEDIAL INVESTIGATION/FEASIBILITY STUDY WAS INITIATED IN THE FALL OF 1983 BY THE EPA IN COOPERATION WITH THE NJDEP. IN THE SUMMER OF 1984, AN EVALUATION OF DATA COLLECTED IN THE HOLLY RUN AREA AND BEHIND THE FOX CHASE II DEVELOPMENT INDICATED THAT THE AIR QUALITY OF THE AREA AND THE WATER QUALITY HAD BEEN DEGRADED. TO BETTER ASSESS THE DEGREE OF DEGRADATION AND TO BETTER ADDRESS THE PROBLEMS IDENTIFIED, THE EPA AND THE NJDEP INITIATED A FOCUSED FEASIBILITY STUDY (FFS) IN THE FALL OF 1984.

IN FEBRUARY 1985, THE NJDEP INITIATED A REMEDIAL DESIGN -- BASED ON PRELIMINARY INFORMATION OF THE FFS – TO ADDRESS THE PROBLEM BEHIND THE FOX CHASE II DEVELOPMENT. THE SCOPE OF THIS DESIGN, CALLED AN INITIAL REMEDIAL MEASURE (IRM), WAS PRESENTED TO THE PUBLIC ON APRIL 11, 1985, BY THE NJDEP. THE EPA HELD A MEETING ON MAY 2, 1985, IN THE GLOUCESTER TOWNSHIP MUNICIPAL BUILDING TO EXPLAIN THE FINDINGS OF THE FFS AND TO PRESENT AN IRM FOR THE FOX CHASE II AREA. THIS IRM WAS COMPARABLE TO THE IRM PROPOSED BY THE NJDEP.

CITIZEN CONCERNS IN MAY INCLUDED (A) THE PROPOSAL TO HAVE THE PRE-TREATED WATER FROM THE HOLLY RUN AREA SENT TO THE MUNICIPAL UTILITIES AUTHORITY (MUA) FOR FURTHER TREATMENT, (B) THE NEED FOR AN EVACUATION PLAN DURING ANY REMEDIAL CONSTRUCTION ACTIVITIES, AND (C) THE IDENTITIES OF THE POTENTIALLY RESPONSIBLE PARTIES AND THEIR FINANCIAL RESPONSIBILITY.

IN AUGUST 1985, EPA RELEASED THE DRAFT RI/FS REPORT TO THE PUBLIC. A PUBLIC COMMENT PERIOD WAS OPENED FROM AUGUST 2 TO AUGUST 23, 1985. EPA PRESENTED THE FINDINGS OF THE RI/FS AND RECEIVED VERBAL COMMENTS AT A PUBLIC MEETING ON AUGUST 19, 1985 AT THE GLOUCESTER MUNICIPAL TOWNSHIP BUILDING. COPIES OF THE RI/FS REPORT ARE AVAILABLE AT THE GLOUCESTER TOWNSHIP LIBRARY, THE CAMDEN COUNTY LIBRARY, THE CAMDEN COUNTY COLLEGE LIBRARY, AND AT THE EPA OFFICE IN NEW YORK AND THE DEP OFFICE IN TRENTON.

B. SUMMARY OF MAJOR QUESTIONS AND COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES

MAJOR COMMENTS AND QUESTIONS RAISED DURING THE GEMS LANDFILL SITE PUBLIC COMMENT PERIOD ARE SUMMARIZED BELOW. EXAMPLES OF THE SPECIFIC COMMENTS AND QUESTIONS RAISED AND EPA RESPONSES ARE ALSO PROVIDED. THE PUBLIC COMMENT PERIOD WAS SCHEDULED FROM AUGUST 2 TO AUGUST 23, 1985 TO RECEIVE INPUT FROM THE PUBLIC ON THE DRAFT FEASIBILITY STUDY. HOWEVER, AS A RESULT OF PUBLIC COMMENTS RECEIVED AT THE AUGUST 19 MEETING, EPA EXTENDED THE COMMENT PERIOD TO AUGUST 31, 1985. THE COMMENTS ARE ORGANIZED BY THE FOLLOWING TOPICS:

(1) COST/FUNDING ISSUES
(2) LEGAL ISSUES
(3) PUBLIC HEALTH CONCERNS
(4) PROPERTY VALUES/RED LINE ZONE ISSUES
(5) TECHNICAL/REMEDIAL ACTION CONSIDERATIONS
(6) ADMINISTRATIVE ISSUES.

1. COST/FUNDING ISSUES

SEVERAL RESIDENTS EXPRESSED CONCERN OVER THE AVAILABILITY OF MONEY IN THE SUPERFUND PROGRAM. SPECIFICALLY, THEY WANTED TO KNOW IF THE PUBLICIZED SLOWDOWN OF REMEDIAL WORK AT SELECTED SITES INDICATED THAT THE GEMS LANDFILL WOULD NOT BE CLEANED UP.

EPA RESPONDED THAT REAUTHORIZATION OF THE SUPERFUND BILL HAS NOT YET BEEN ACTED UPON BY CONGRESS. THE CURRENT FIVE-YEAR BILL EXPIRES AT THE END OF THE 1985 FISCAL YEAR. EPA WILL BEGIN A SLOWDOWN OF REMEDIAL WORK AT SELECTED SITES IN ORDER TO CONSERVE FUNDS. THE NJDEP RESPONDED THAT THE STATE OF NEW JERSEY WILL PROVIDE FUNDING FOR THE DESIGN OF THE REMEDIAL ALTERNATIVE SHOULD THE BILL NOT BE REAUTHORIZED BEFORE SEPTEMBER 30, 1985.

ISSUE: I HAVE A QUESTION ON THE SUPERFUND. WHAT HAPPENS TO THE MONEY THAT THE GOVERNMENT COLLECTED FROM 1980 TO 1985 AND NOW HAS?

RESPONSE: THE TAX GENERATES ABOUT $300 MILLION PER YEAR. IN 1985, WE EXPECT TO SPEND ABOUT $500 MILLION ALONE. IF YOU WERE TO TRACE THE FUNDING WHICH TOOK PLACE UNDER THE PROGRAM, YOU WOULD DISCOVER THAT SMALL AMOUNTS OF MONEY WERE SPENT IN THE FIRST COUPLE OF YEARS, AS WE WERE CONDUCTING STUDIES WHICH WERE RELATIVELY INEXPENSIVE. HOWEVER, AS WE MOVED TO THE LATER YEARS, WE STARTED TO IMPLEMENT SOME REMEDIES, WHICH WERE RUNNING $10-20 MILLION APIECE. AT THIS POINT IN TIME, THERE IS NOT THAT MUCH MONEY LEFT IN THE BANK -- THERE'S SOMEWHERE BETWEEN $300 AND 500 MILLION AND THAT HAS TO CARRY US UNTIL CONGRESS REAUTHORIZES SUPERFUND.

2. LEGAL ISSUES

LEGAL TOPICS OF CONSIDERABLE DISCUSSION INCLUDED THE SEARCH FOR POTENTIALLY RESPONSIBLE PARTIES, THE RECOVERY OF FUNDS THAT WILL BE EXPENDED ON REMEDIAL ACTIONS, AND THE PROSECUTION OF ANY INDIVIDUALS GUILTY OF DISPOSING HAZARDOUS WASTES AT THE GEMS LANDFILL. EPA EXPLAINED THAT ITS FIRST PRIORITY WAS TO CLEAN UP THE SITE IN ORDER TO PROTECT THE PUBLIC HEALTH AND WELFARE AS WELL AS THE ENVIRONMENT. THE ATTORNEY REPRESENTING THE TOWNSHIP ANSWERED MANY OF THE QUESTIONS.

ISSUE: WHO IS ULTIMATELY GOING TO BE RESPONSIBLE FOR THE ATTAINMENT OF THE FUNDS FOR CLEANUP OF THIS SITE? I HAVE HEARD RUMORS THAT EVENTUALLY THE TOWNSHIP WILL BE BILLED FOR WHATEVER THE STATE OR FEDERAL GOVERNMENT GIVES OUT FOR THE REMEDIAL CLEANUP. WILL SOMEONE PLEASE TELL ME THAT I AM WRONG?

RESPONSE: UNDER SUPERFUND, ONCE WE COMPLETE THE CLEANUP (AND THE INTENT IS TO CLEAN UP THE SITE FIRST AND TO WORRY ABOUT RECOVERING THE MONEY SECONDLY) AN ATTEMPT WILL BE MADE TO IDENTIFY THE POTENTIALLY RESPONSIBLE PARTIES AND TO COVER FUNDS. WE CANNOT COMMENT FURTHER ON THAT POINT RIGHT NOW.

ISSUE: YOU'RE SAYING THAT THERE IS THE POTENTIAL THAT THE TOWNSHIP COULD BE SUED IN ORDER THAT YOU COULD RECOVER THE FUNDS YOU HAD SPENT?

RESPONSE: NO DECISION HAS BEEN MADE ON WHOM TO SUE OR WHEN TO SUE.

3. PUBLIC HEALTH CONCERNS

RESIDENTS EXPRESSED CONCERN OVER THE QUALITY OF THE AIR AND THE QUALITY OF THE GROUNDWATER. WHEN ASKED IF ADDITIONAL AIR SAMPLING WOULD BE CONDUCTED, THE EPA STATED THAT IT HAD SAMPLED THE AIR IN THE PAST AND WAS PREPARED TO PROCEED AS IF THERE WERE A PROBLEM, RATHER THAN WAIT FOR CONCLUSIVE PROOF. IN ADDITION, SEVERAL FIREMEN OF THE LOCAL FIRE COMPANY QUESTIONED POSSIBLE HEALTH HAZARDS WHEN FIGHTING A FIRE WHICH MIGHT OCCUR AT THE LANDFILL. THE NJDEP SAID THAT IT HAD TRIED TO ARRANGE A MEETING WITH THE FIREMEN IN THE PAST, BUT THE MEETING APPARENTLY DID NOT GET SCHEDULED. THE NJDEP STATED THAT IT WILL ATTEMPT TO ARRANGE ANOTHER MEETING.

ISSUE: I HAVE ASKED THIS QUESTION AT EVERY MEETING THAT I HAVE EVER BEEN TO WITH YOU PEOPLE. WHEN THE EXCAVATION BEGINS, IS THERE AN EVACUATION PLAN? I LIVE IN FOX CHASE ONE; WE HAVE ONE WAY IN AND ONE WAY OUT. IF THIS DIGGING STARTS, I WANT TO KNOW IF I HAVE A SAFE WAY TO GET MY FAMILY OUT OF THERE.

RESPONSE: STANDARD OPERATING PROCEDURE WITHIN THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION -- BECAUSE THE DEP WILL ASSUME THE LEAD ONCE EXCAVATION BEGINS -- DICTATES THAT WE HAVE A CONTINGENCY PLAN THAT WILL BE DEVELOPED WITH EMERGENCY MANAGEMENT PEOPLE BOTH IN THE TOWNSHIP AND THE COUNTY.

ISSUE: BUT WHEN DO WE HEAR ABOUT IT?

RESPONSE: BEFORE ANY SHOVEL GOES INTO THE GROUND, BEFORE ANY ITEM IS REMOVED, WE WILL HAVE A CONTINGENCY PLAN IN PLACE.

ISSUE: I AM AN ATTORNEY AND I REPRESENT ABOUT A DOZEN FAMILIES WHO BOUGHT HOUSES IN THE VICINITY OF THE GEMS LANDFILL. MY QUESTION HAS TO DO WITH SOMETHING ON PAGE TWO OF THE HANDOUT, WHICH SAID, "THE NJDEP AND THE EPA HAVE DETERMINED THAT THE CONTAMINATED GROUNDWATER AND SURFACE WATER MAY POSE A POTENTIAL HEALTH HAZARD TO LOCAL RESIDENTS". I WAS WONDERING IF SOMEONE COULD SPELL THAT OUT AND TELL ME HOW MUCH OF A HAZARD THERE IS AND OF WHAT CONTAMINANT(S).

RESPONSE: THE POTENTIAL HAZARD WE REFERRED TO IS FOR ANYONE CONSUMING GROUNDWATER OR SURFACE WATER. CURRENTLY, NOBODY IS CONSUMING THE GROUNDWATER OR SURFACE WATER. THAT IS WHERE THE POTENTIAL COMES IN.

ISSUE: MY WIFE WORKS AT A PLACE ACROSS FROM THIS LANDFILL. I READ IN THE PAPER SOMETHING ABOUT AIR CONTAMINATION. IS THE AIR CONTAMINATED WITH TOXIC ELEMENTS/MATERIALS? IS THERE A DANGER OF HER WORKING CLOSE TO THAT DUMP?

RESPONSE: ALL WE CAN TELL YOU IS WHAT THE RESULTS OF OUR STUDIES HAVE SHOWN. WE CANNOT SAY THAT THERE IS NOT A DANGER BECAUSE OUR STUDIES HAVE NOT BEEN DONE 24 HOURS A DAY, 365 DAYS A YEAR

FOR THE PAST 5 OR 6 YEARS. OUR STUDIES INDICATE THAT THERE IS AN AIR DEGRADATION PROBLEM, BUT NOT NECESSARILY A PROBLEM THAT WOULD POSE IMMINENT HEALTH HAZARDS. THERE IS A PERCEIVED PROBLEM OUT THERE, AND LANDFILLS ARE VERY ODIFEROUS. WE HAVE NOT BEEN ABLE TO ACTUALLY CONCLUSIVELY PROVE THAT THERE IS A PUBLIC HEALTH PROBLEM OR EMERGENCY CAUSED BY THE AIR CONTAMINANTS THAT WE'VE BEEN ABLE TO MEASURE. NEVERTHELESS, WE'RE PROCEEDING TO TRY TO DO SOMETHING AS QUICKLY AS POSSIBLE TO MITIGATE THE DEGRADING AIR QUALITY AROUND THE LANDFILL.

ISSUE: IF, IN 2 1/2 YEARS, THE GROUNDWATER CONTAMINATION EXTENDS AS FAR AS UNDER MY HOUSE OR PROPERTY, WILL I STILL BE ABLE TO SAFELY LIVE THERE?

RESPONSE: UNLESS YOU'RE DRINKING THE WATER, IT SHOULD NOT DIRECTLY AFFECT YOU.

ISSUE: YOU HAVE BEEN TALKING ABOUT THE COHANSEY AQUIFER. I WAS UNDER THE IMPRESSION THAT OUR MUNICIPAL WATER IS TAKEN FROM THE COHANSEY AQUIFER. IS THAT TRUE OR NOT?

RESPONSE: AS FAR AS WE KNOW, ALL OF THE MUNICIPAL WATER IS TAKEN FROM THE MT. LAUREL AQUIFER.

ISSUE: HAVE YOU EVER TESTED FOR INFECTIOUS AGENTS/MICRO-ORGANISMS OF ANY KIND?

RESPONSE: THE BIOLOGICAL HALF-LIVES OF INFECTIOUS AGENTS OUTSIDE OF THE BODY IS VERY SHORT. IT IS A VERY HOSTILE ENVIRONMENT BENEATH THAT LANDFILL. IT IS HOT, WITH THE DISTINCT ABSENCE OF PARTICULAR GASES AND THE PRESENCE OF TOXIC GASES THAT MAY WELL IN FACT INHIBIT THE MICRO-ORGANISMS.

ISSUE: WE HEARD ABOUT THE WATER (WELL) TESTING NORTH OF THE DUMP. WHAT ABOUT WELLS SOUTH OF THE DUMP?

RESPONSE: THE WELLS TESTED SOUTH OF THE DUMP ARE PRIMARILY ALONG HICKSTOWN ROAD, ACTUALLY SOUTHWEST OF THE SITE. WE TESTED ALL RESIDENTIAL WELLS AND IN THE LATEST ROUND, WE HAVE FOUND NO CONTAMINATION. WE DID HAVE A MONITORING WELL THAT SHOWED TRACE CONTAMINATION TO THE SOUTH.

ISSUE: HAS ANYBODY CHECKED THE CITY WATER PIPES FOR ARSENIC?

RESPONSE: THE STATE OF NEW JERSEY REQUIRES TESTING OF MUNICIPAL WATER SUPPLIES ABOUT THREE TIMES A YEAR. (DAVE SWEENEY, OF THE CAMDEN COUNTY HEALTH DEPARTMENT, ANSWERED THAT THE MUNICIPAL WATER SUPPLY IS CHECKED REGULARLY AND THAT ARSENIC IS ONE OF THE COMPOUNDS TESTED FOR.

4. PROPERTY VALUES/RED LINE ZONE ISSUES

MANY CITIZENS QUESTIONED THE PURPOSE OF THE RED LINE ZONE AND THE EFFECTS IT HAD ON THEIR PROPERTY VALUES. REAL ESTATE OFFICES AND LENDING INSTITUTIONS HAVE APPARENTLY MISINTERPRETED THE MEANING OF THIS ZONE, MAKING IT DIFFICULT FOR RESIDENTS TO SELL THEIR HOMES. THE NJDEP RESPONDED TO THESE CONCERNS.

ISSUE: PLEASE EXPLAIN WHAT THE RED LINE IS.

RESPONSE: THE RED LINE WAS DRAWN TO OUTLINE AN AREA AROUND THE LANDFILL THAT WOULD IDENTIFY THOSE AREAS REQUIRING SPECIAL CONSIDERATION PRIOR TO THE STATE GRANTING A PERMIT FOR THE INSTALLATION OF A POTABLE WELL IN THAT ZONE. THE RED LINE WAS DEVISED SO THAT WHEN SOMEONE CAME INTO THE DEPARTMENT OF ENVIRONMENTAL PROTECTION, SOMEBODY WOULD PAY PARTICULAR ATTENTION TO THE FACT THAT IT (THE WELL) WAS BEING PUT IN CLOSE TO A HAZARDOUS WASTE SITE. THAT'S ALL IT WAS INTENDED TO BE USED FOR.

ISSUE: WILL THE RED LINE ZONE BE EXTENDED OR REDUCED? THAT ZONE IS REALLY AFFECTING THE PROPERTY VALUES OF OUR HOMES.

RESPONSE: THE RED LINE ZONE IS A ZONE THAT'S BEEN IMPOSED BY THE STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION TO INDICATE ZONES OF POTENTIAL HYDROGEOLOGICAL IMPACT. AS A RESULT OF THIS STUDY, THE ZONE IS BEING REDEFINED AND THE LINE OF DEMARCATION WILL BE RESTRUCTURED, PROBABLY WITHIN TWO WEEKS.

ISSUE: HAVE YOU EXPLAINED THAT TO THE REALTORS AND WILL YOU EXPLAIN THAT TO THE REAL ESTATE PEOPLE?

RESPONSE: YES, WE HAVE. I CANNOT EXPLAIN WHAT THEIR ACTIONS ARE EXCEPT TO TELL YOU THAT THERE IS A LOT OF HYSTERIA BOTH IN THE REAL ESTATE INDUSTRY AS WELL AS THE BANKING COMMUNITY CONCERNING HAZARDOUS WASTES. WE HAVE EXPLAINED THIS (RED ZONE) TO THEM. WE HAVE EXPLAINED IT TO SENATOR DALTON, AND IN TURN, SENATOR DALTON HAS GONE TO THEM.

ISSUE: ON PAGE 2 IN THE HANDOUT, IT IS STATED THAT CONTAMINATION HAS MIGRATED ABOUT 800 FEET FROM THE

SITE. ON THAT BASIS, AM I CORRECT IN ASSUMING THAT YOU WILL REDRAW OR REDEFINE THE RED ZONE?

RESPONSE: YES, THAT'S PART OF IT.

ISSUE: WHO WILL HAVE THE AVAILABILITY OF THE REDRAWN RED ZONE? HOW WILL THE REAL ESTATE AGENCIES BE NOTIFIED AND WORK WITH THIS?

RESPONSE: WE WILL HAVE TO COME DOWN HERE AND HAVE A MEETING WITH THE TOWN OFFICIALS TO EXPLAIN THE DEMARCATION OF THE ZONE AND GET ADVICE AS TO WHAT WOULD BE AN APPROPRIATE ACTION IN TERMS OF INFORMING REALTORS AND LENDING INSTITUTIONS. WE'RE WILLING TO DO THAT.

ISSUE: IS THE ZONE GOING TO DISAPPEAR ONCE YOU CAP THE SITE AND TAKE CARE OF PUMPING THE GROUNDWATER.

RESPONSE: IT WILL PROBABLY SHRINK A LOT.

ISSUE: BUT WE'LL NEVER BE OUT IF IT, RIGHT?

RESPONSE: WE DON'T KNOW. WE CAN'T ANSWER THAT.

5. TECHNICAL/REMEDIAL ACTION CONSIDERATIONS

THE EPA HAS TENTATIVELY RECOMMENDED A REMEDIAL ALTERNATIVE FOR THE GEMS LANDFILL SITE. THIS REMEDIAL ACTION (ALTERNATIVE #8) INCLUDES CAPPING THE LANDFILL AND PUMPING AND TREATING THE CONTAMINATED GROUNDWATER. CONCERNS WERE RAISED REGARDING THE EFFECTIVENESS OF THIS REMEDY, THE LENGTH OF TIME TO IMPLEMENT THIS REMEDY, AND THE PROPOSED USE OF THE MUNICIPAL UTILITIES AUTHORITY IN TREATING/DISPOSING THE GROUNDWATER.

ISSUE: OF THE ALTERNATIVES HERE, IS THERE A PROBABILITY FOR #3 OR #4 BEING SELECTED.

RESPONSE: WE HAVE TENTATIVELY RECOMMENDED #8.

ISSUE: YOU MENTIONED IN THE #8 ALTERNATIVE SOMETHING ABOUT GROUNDWATER CLEANUP -- THAT YOU WERE SOMEHOW GOING TO PULL THE GROUNDWATER BACK. ARE YOU REFERRING TO PULLING GROUNDWATER FROM UNDER OUR HOUSES? WOULD THAT CAUSE ANY KIND OF EXCAVATION PROBLEMS OR BASEMENT PROBLEMS? WOULD HOUSES COLLAPSE?

RESPONSE: BECAUSE OF THE DEPTH OF THE GROUNDWATER WHERE IT CURRENTLY EXISTS, DO NOT ANTICIPATE ANY PROBLEMS THAT WOULD DEVELOP WITH REGARDS TO YOUR HOUSE. THE WATER, IN SOME AREAS, IS ABOUT 20-30 FEET DEEP.

ISSUE: HAS THIS METHOD OF REMEDIAL ACTION (CAPPING) EVER BEEN UTILIZED ANYWHERE ELSE. IS THERE AN EXPERIENCE FACTOR HERE, OR ARE YOU DEALING WITH AN UNKNOWN?

RESPONSE: CAPS ARE PROBABLY ONE OF THE MOST COMMON REMEDIES THAT HAVE BEEN USED, EVEN IN NON-HAZARDOUS WASTE LANDFILLS. WE ARE PRETTY COMFORTABLE WITH THIS TECHNOLOGY.

ISSUE: HOW FAST IS THE PLUME MOVING AWAY FROM THE SITE?

RESPONSE: IT IS AVERAGING ABOUT 10 TO 15 FEET PER YEAR. THAT VARIES, DEPENDING ON WHICH AREA/DIRECTION WE ARE STUDYING. IT IS MOVING MUCH SLOWER IN THE WESTERN AND SOUTHERN AREAS. THE ESTIMATE CHANGES FROM YEAR TO YEAR, DEPENDING ON THE AMOUNT OF GROUNDWATER THAT COMES INTO CONTACT WITH THE WASTES.

ISSUE: WITH REGARD TO #8, WHAT HAPPENS TO THE CHEMICALS IN THE LANDFILL?

RESPONSE: WE WILL CONTAIN THEM. THEY WILL STAY INSIDE THE LANDFILL.

ISSUE: FOR HOW LONG?

RESPONSE: HOPEFULLY FOREVER, OR UNTIL THE CHEMICALS NATURALLY DEGRADE. MOST OF THESE CHEMICALS HAVE BIOLOGICAL HALF-LIVES.

ISSUE: WHAT IS THE HALF-LIFE OF ARSENIC?

RESPONSE: ARSENIC IS OBVIOUSLY A VERY PERSISTENT COMPOUND. IT WILL BE THERE FOR A LONG TIME, THAT IS TRUE. BUT IT IS ONE OF THE EASIER ONES TO CONTAIN, AS MOST HEAVY METALS ARE.

ISSUE: IN SOLUTION #8, ONCE YOU IMPLEMENT IT, HOW LONG WILL IT LAST?

RESPONSE: MOST OF THE SOLUTIONS THAT WE DESIGN THAT INVOLVE CAPS HAVE AN APPROXIMATE 30-YEAR DESIGN LIFE. THE STATE, AS PART OF THE SUPERFUND PROGRAM, TAKES RESPONSIBILITY AT ITS OWN EXPENSE, FOR THE MAINTENANCE ON ANYTHING THAT THE GOVERNMENT WILL BUILD.

ISSUE: ONCE YOU COME UP WITH A DEFINITE PLAN THAT YOU WILL INPUT, HOW LONG WILL IT TAKE THE DEP OR WHOEVER IT IS WHO IS GOING TO DO THE WORK?

RESPONSE: THE STATE WILL BEGIN TO IMPLEMENT ITS SHORT-TERM ACTION, DESIGNED TO DEAL WITH SOME OF THE VOLATILE AIR EMISSIONS IN AND AROUND THE LANDFILL, WITHIN THE NEXT FEW MONTHS. THAT CONSTRUCTION WILL PROBABLY START IN EARLY FALL. WHILE THAT WORK IS ONGOING, THE STATE WILL PRESUMABLY HIRE A DESIGN CONTRACTOR TO DEVELOP THE PLANS NEEDED FOR THE ACTUAL CONSTRUCTION WORK. WE PRESUME IT WILL TAKE ABOUT 12 MONTHS BEFORE CONSTRUCTION FOR THE MAIN REMEDY WILL BEGIN AND IT WOULD TAKE SOMEWHERE IN EXCESS OF A YEAR TO COMPLETE THAT CONSTRUCTION.

ISSUE: SO YOU'RE TALKING ABOUT 2 1/2 YEARS FROM NOW?

RESPONSE: BEFORE FINAL RESOLUTION? ACTUALLY, IT WILL BE LONGER IF YOU INCLUDE THE TREATMENT OF GROUNDWATER AND PUMPING, WHICH IS A VERY LONG TERM COMMITMENT AND PROCESS. POTENTIALLY, THERE ARE THREE DIFFERENT ACTIONS THAT ARE GOING TO BE OCCURRING AT THE GEMS LANDFILL SIMULTANEOUSLY. WE WILL HOPEFULLY START THE BIDDING PROCESS FOR THE INITIAL REMEDIAL MEASURE IN EARLY SEPTEMBER; WE EXPECT TO BEGIN WORK ON THAT IRM IN EARLY NOVEMBER. THIS IRM IS DESIGNED TO MITIGATE THE IMPACT FROM GASES EMANATING FROM THE LANDFILL, AND WILL INCLUDE SELECTIVE COVERING AS WELL AS A WELL POINT SYSTEM TO COLLECT THE LEACHATE.

THE LONG TERM REMEDIATION OF THIS PARTICULAR PROJECT IS WHAT WE ARE DISCUSSING TONIGHT, AND THAT INCLUDES A DESIGN PROCESS WHICH WILL PROBABLY LAST FOR ABOUT A YEAR. BUT DURING THAT YEAR THERE WILL BE ACTIVITY AT THE SITE.

IN ADDITION TO THAT, SOME OF YOU PEOPLE REALIZE THAT WE'VE IDENTIFIED A POTENTIAL METHANE PROBLEM ASSOCIATED WITH THE SITE. PEOPLE'S HOUSES WILL BE FITTED WITH METHANE DETECTORS. YOU HAVE TO REALIZE THAT WE'VE BEEN IN EVERY PERSON'S HOME, WHICH IS POTENTIALLY IMPACTED, WITH METHANE METERS AND EXPLOSIMETERS, AND WE HAVE NOT DETECTED A PROBLEM IN ANYBODY'S HOME NOR ABOVE THE GROUND. THE METHANE DETECTORS WILL BE AVAILABLE TO US HOPEFULLY BY THE END OF THIS MONTH, AND THEY WILL BE FITTED INTO THE PEOPLE'S HOMES.

YOU SHOULD ALSO KNOW THAT DEP IS OFFICIALLY PETITIONING EPA TO PERFORM WHAT IS CALLED AN IMMEDIATE REMOVAL ACTION TO MITIGATE THE EFFECTS IMPOSED BY THE METHANE. THE ACTION, IF NOT ADDRESSED BY THE EPA, WILL BE PICKED UP BY THE DEP. I WANT TO BE VERY CLEAR AT THIS POINT IN TIME THAT WE HAVE NOT DETECTED ANY METHANE TO CAUSE CONCERN IN ANYBODY'S HOUSE. AND THERE'S GOOD REASON FOR WHAT'S HAPPENING OUT THERE. SOME OF YOU PEOPLE REALIZE THAT WHEN WE PUT THE METER IN THE GROUND, WE GET METHANE READINGS THAT CAUSE SOME CONCERN. BUT IMMEDIATELY ABOVE THE GROUND, WE DON'T. AND THAT'S HAPPENING BECAUSE THE GROUND CONTAINS A RELATIVELY SMALL AMOUNT OF AIR. WHEN THAT AMOUNT OF METHANE IS RELEASED TO A MUCH LARGER VOLUME, IT'S CONCENTRATION PRESENTS NO HAZARD. BUT NONETHELESS, AS THE REPORT REFLECTS, WE HAVE NOT IDENTIFIED ANY IMMINENT HAZARD ASSOCIATED WITH THE LANDFILL. HOWEVER, WE'RE BEING CAUTIOUS AND CONSERVATIVE IN OUR APPROACH, AND WE'RE TRYING TO ERR ON THE SIDE OF SAFETY.

ISSUE: IS THE GROUNDWATER SITUATION GOING TO BE TAKEN CARE OF IN THE 30-YEAR PERIOD BY THE MUNICIPAL UTILITIES AUTHORITY (MUA) OR IS THERE ANOTHER PART OF THIS REMEDIAL ACTION THAT WILL TAKE CARE OF THE GROUNDWATER?

RESPONSE: THE LONG-TERM GROUNDWATER PUMPING AND TREATMENT WILL BE HANDLED ESSENTIALLY ALONG THE SAME PROCEDURE THAT WE ARE HANDLING THE GROUNDWATER TREATMENT FOR THE IRM. THE TWO WILL EVENTUALLY BE INTEGRATED

TOGETHER. THE STEPS THAT THE STATE HAS BEEN GOING THROUGH WITH THE MUA CONCERNING THE IRM TREATABILITY STUDY -- THAT IS, SITTING DOWN WITH THE MUA AND REVIEWING IT, SITTING DOWN WITH YOU AND LISTENING TO YOUR CONCERNS -- THESE SAME STEPS WILL BE FOLLOWED AGAIN WITH THE LONG-TERM GROUNDWATER TREATMENT.

ISSUE: IT SEEMS TO ME THAT YOU'LL BE DOING A NEW TREATABILITY STUDY ON THE CONSTITUENTS OF THE GROUNDWATER THAT WILL BE COMING OUT OF THE LANDFILL.

RESPONSE: WE ANTICIPATE, BECAUSE OF THE INCREASED FLOW, THAT THE STATE AND THE MUA WOULD REQUIRE A NEW TREATABILITY STUDY BECAUSE WE ARE TALKING ABOUT ESSENTIALLY THREE TIMES THE VOLUME, FOR THE LONG-TERM GROUNDWATER CLEANUP. THE BOTTOM LINE IS THAT WE HAVEN'T MADE A DECISION CONCERNING WHERE THAT GROUNDWATER WILL GO. NOBODY SHOULD CONFUSE THE TREATABILITY STUDY WITH THE FEASIBILITY STUDY. THE TREATABILITY STUDY IS VERY SHORT.

ISSUE: I WAS HERE AT THE LAST MEETING, AND I BROUGHT UP THE FACT THAT IF YOU TOOK THE WATER AND PUT IT IN THE MUA, THE CHEMICALS MAY AFFECT THE PEOPLE. WE DO NOT WANT THIS. I WANT IT EMPHASIZED AND I WANT IT UNDERSTOOD. WE DO NOT WANT IT, AND IF WE HAVE TO TAKE FURTHER ACTION, WE WILL.

RESPONSE: WHEN WE (NJDEP) LOOKED AT SHIPPING WATER FROM THE LANDFILL TO THE MUA, WE MODELED EMISSIONS -- EMISSIONS THAT WOULD COME FROM MANHOLE COVERS AND THE SEWERS THEMSELVES -- IF WE WERE NOT GOING TO TREAT THE GROUNDWATER, AND IF WE WERE GOING TO TREAT THE GROUNDWATER. WE CAN SHOW YOU HOW THOSE EMISSIONS WOULD BE INSIGNIFICANT, IF NOT NIL, AND WE ARE PREPARED TO DO THAT.

ISSUE: THE ORIGINAL STUDY RELEASED BY THE NJDEP IN JUNE 1982 HAD APPROXIMATELY 40 WELLS THAT WERE SAMPLED IN THE AREA. QUITE A FEW OF THEM HAD TOTAL VOLATILES WELL OVER THE LIMIT. WHAT HAPPENED TO THEM?

RESPONSE: THE RESIDENTIAL WELLS WERE NOT OVER THE LIMIT (100 PPB). THE RESULTS THAT SHOW VOLATILES OVER THE LIMIT FOR GROUNDWATER ARE SURFACE WATER RESULTS.

ISSUE: ONCE WORK STARTS, WILL IT STOP DURING THE WINTER?

RESPONSE: HOPEFULLY NOT. HOWEVER, WEATHER CONDITIONS MAY CAUSE US TO TEMPORARILY STOP REMEDIAL ACTIVITY, BUT THE SITE WOULD BE ADEQUATELY SECURED FOR THAT PERIOD.

6. ADMINISTRATIVE ISSUES

MR. BEN STONELAKE, ATTORNEY FOR GLOUCESTER TOWNSHIP, REQUESTED THAT EPA EXTEND THE PUBLIC COMMENT PERIOD SO THAT TOWNSHIP OFFICIALS AND THE CONSULTANT HIRED BY THE TOWNSHIP COULD HAVE ADEQUATE TIME TO REVIEW THE RI/FS. MR. STONELAKE STATED THAT THE TOWNSHIP HAS A VESTED INTEREST IN WHATEVER REMEDIAL ACTION IS ADOPTED FOR THE SITE BECAUSE THEY HAVE BEEN IDENTIFIED AS A POTENTIALLY RESPONSIBLE PARTY AND MAY BE FINANCIALLY LIABLE. OTHER CONCERNS EXPRESSED BY THE CITIZENS INCLUDED THE TIMETABLES FOR ANY CLEANUP, AS WELL AS POLICY DECISION-MAKING PROCESSES.

ISSUE: HOW CAN WE OBTAIN COPIES OF THE NUS STUDY?

RESPONSE: THE REPORT IS PUBLICLY AVAILABLE HERE AT THE TOWNSHIP CLERK'S OFFICE, AT THE GLOUCESTER TOWNSHIP LIBRARY, THE CAMDEN COUNTY LIBRARY, THE CAMDEN COUNTY COLLEGE LIBRARY, AND WITH THE RESIDENTS AGAINST LANDFILLS CITIZEN'S GROUP. THERE IS ALSO A COPY OF THE REPORT AT OUR OFFICE IN NEW YORK AND THE STATE OFFICE IN TRENTON.

ISSUE: WHO DECIDES WHICH ALTERNATIVE IS SELECTED?

RESPONSE: THE REGIONAL ADMINISTRATOR MAKES THE FINAL DECISION, TAKING INTO ACCOUNT RESULTS OF THE FS AND ANY PUBLIC COMMENTS THAT WE RECEIVE. WE WILL EXTEND THE PUBLIC COMMENT PERIOD TO AUGUST 31.

ISSUE: DO YOU HAVE A TENTATIVE DATE WHEN WORK FOR ALTERNATIVE #8 WILL BEGIN?

RESPONSE: THE AGENCY WILL EXTEND THE PUBLIC COMMENT PERIOD UNTIL AUGUST 31. THE AGENCY HOPES TO MAKE A

DECISION ON THE REMEDY DURING THE MONTH OF SEPTEMBER. THE STATE HAS INDICATED THAT IT WANTS TO TAKE THE LEAD IN THE DESIGN AND IMPLEMENTATION OF THE REMEDY; WE EXPECT THIS TO OCCUR SOMETIME LATE IN SEPTEMBER. THE DESIGN AND IMPLEMENTATION OF THE REMEDY IS GOING TO BE A LONG PROCESS. THE DESIGN WILL TAKE ANYWHERE FROM 9-12 MONTHS, IF NOT LONGER.

ISSUE: WHEN YOU FINALLY DEVELOP YOUR GROUNDWATER TREATMENT SCHEME, WILL YOU BE ABLE TO COME BEFORE THE PUBLIC TO EXPLAIN WHERE THE LEACHATE SYSTEM WILL BE SO AS NOT TO INTERFERE WITH DEVELOPMENT OF REAL ESTATE?

RESPONSE: WE ARE NOT COMPELLED BY GUIDANCE OR LAW TO COME BACK TO YOU AFTER THE DESIGN PROCESS TO SHOW YOU WHAT WE'RE LAYING OUT. HOWEVER WE WILL TALK TO THE COMMUNITY AND LOCAL OFFICIALS.

ISSUE: WHAT IS THE LOCATION OF THE MUA WHERE THIS LEACHATE WILL BE SENT?

RESPONSE: CHEWS LANDING, GLENDORA, BUT WE HAVEN'T MADE THE DECISION OF WHERE THE LEACHATE WILL BE SENT.

ISSUE: DOES A PLANT EXIST NOW OR WILL YOU HAVE TO BUILD ONE?

RESPONSE: THE OPTIONS ARE TO BUILD A TREATMENT PLANT ONSITE WITH DIRECT DISCHARGE OR TO PRETREAT AND GO TO THE MUA. WE HAVEN'T MADE A DECISION YET.

C. REMAINING CONCERNS

RESIDENTS EXPRESSED CONSIDERABLE CONCERN OVER EPA AND NJDEP AVAILABILITY IN THE FUTURE REGARDING MEETINGS WITH LOCAL OFFICIALS, REALTORS AND LENDING INSTITUTIONS SO AS TO EXPLAIN THE DEMARCATION AND SIGNIFICANCE OF THE RED LINE ZONE AREA. NJDEP REPRESENTATIVES STATED THAT THEY WOULD BACK THE RESIDENTS "ALL THE WAY". IN ADDITION, NJDEP REPRESENTATIVES STATED THAT THEY WOULD MEET WITH THE LOCAL FIREMEN TO EXPLAIN THE POSSIBLE HEALTH HAZARDS THAT THEY MAY FACE WHEN FIGHTING FIRES.

RESPONSIVENESS SUMMARY
GEMS WRITTEN COMMENTS

IN ADDITION TO THE COMMENTS RECEIVED AT THE AUGUST 19, 1985 MEETING, WRITTEN COMMENTS WERE RECEIVED FROM SEVERAL OF THE POTENTIAL RESPONSIBLE PARTIES (PRP'S) AND ONE CITIZEN. THE COMMENTS FROM THE PRP'S WERE BOTH TECHNICAL AND LEGAL/ADMINISTRATIVE AND ARE SUMMARIZED BELOW WITH EPA'S RESPONSE. THE ONE WRITTEN COMMENT FROM A CITIZEN AND A LETTER RESPONDING TO HIS CONCERN IS ATTACHED AS PART OF THIS RESPONSIVENESS SUMMARY.

TECHNICAL ISSUES

- FOCUSED FEASIBILITY STUDY (FFS)

ISSUE:

THE REMEDIAL INVESTIGATION CONCLUDES THERE IS NO IMMEDIATE THREAT TO HUMAN HEALTH THEREFORE THERE IS NO NEED TO IMPLEMENT THE IRM.

RESPONSE:

INITIAL REMEDIAL MEASURES ARE REMEDIAL ACTIONS TAKEN PURSUANT TO 40 CFR 300.68. AN IMMINENT THREAT TO PUBLIC HEALTH IS NOT REQUIRED FOR EPA TO TAKE ACTION PURSUANT TO THIS SECTION. IF AN IMMINENT THREAT TO PUBLIC HEALTH DID EXIST AT THE SITE EPA COULD TAKE ACTION PURSUANT TO 40 CFR 300.65 IMMEDIATE REMOVAL.

ISSUE:

INSTITUTIONAL CONSTRAINTS, SUCH AS PERMITS AND PUBLIC RESISTANCE TO DISCHARGING PRETREATED LEACHATE TO THE GLOUCESTER TOWNSHIP UTILITIES AUTHORITY (GTUA), ARE EXTENSIVE AND MAY WELL DELAY THE IMPLEMENTATION OF THE IRM, THEREFORE THERE WOULD BE NO IMMEDIATE BENEFIT.

RESPONSE:

SIMILAR INSTITUTIONAL CONSTRAINTS WOULD APPLY TO THE LONG-TERM REMEDIAL ACTION. THE LONG-TERM ACTION HAS NOT YET BEEN FULLY DESIGNED AND EPA ANTICIPATES THIS COULD TAKE OVER 12 MONTHS BEFORE CONSTRUCTION OF THE GROUNDWATER PUMPING AND TREATMENT SYSTEM CAN BEGIN. UNDER THE STATE'S CURRENT SCHEDULE CONSTRUCTION OF THE IRM PUMPING AND TREATMENT SYSTEM CAN BEGIN IN 3-4 MONTHS. THE BENEFIT TO THE ENVIRONMENT BY PREVENTING CONTAMINANTS FROM ENTERING HOLLY RUN FROM THE IRM IS REALIZED SOME 8 MONTHS SOONER THAN WOULD BE FROM THE LONG-TERM ACTION, REGARDLESS OF THE INSTITUTIONAL CONSTRAINTS.

ISSUE:

THE IRM GROUNDWATER TREATMENT SYSTEM MAY HAVE TO BE REMOVED OR ABANDONED IF IT CAN NOT BE INTEGRATED INTO THE DESIGN OF A LONG-RANGE TREATMENT SYSTEM.

RESPONSE:

THE STATE OF NEW JERSEY WILL BE THE LEAD AGENCY FOR BOTH THE IRM AND THE DESIGN AND CONSTRUCTION OF LONG-TERM REMEDIAL ACTION. IT IS REALIZED THE IRM TREATMENT SYSTEM MUST BE DESIGNED TO ALLOW INTEGRATION INTO THE LONG-TERM TREATMENT SYSTEM IN ORDER TO BE CONSISTENT WITH THE LONG-TERM REMEDIAL ACTION. THE IRM DESIGN CONTRACTOR IS DESIGNING THE SYSTEM SO THAT IT CAN BE INTEGRATED INTO THE LONG-TERM TREATMENT SYSTEM.

ISSUE:

THE PROPOSED IRM WILL NOT ELIMINATE ODORS FROM THE LANDFILL, ONE OF THE MAIN REASONS GIVEN FOR IMPLEMENTATION.

RESPONSE:

ELIMINATING THE ODORS IS NOT ONE OF THE MAIN REASONS FOR THE IRM (SEE PAGE 11 OF THE STAFF SUMMARY). SOME REDUCTION OF ODORS CAUSED BY THE ORGANIC CHEMICALS IS AN ADDITIONAL EXPECTED BENEFIT OF THE IRM.

ISSUE:

PRIORITY POLLUTANTS NOT REMOVED BY THE AIR STRIPPER MAY LEAD TO AN INHIBITION OF THE BIOLOGICAL PROCESS AT THE GTMUA FACILITY. THE TREATABILITY STUDY CONCLUDED THAT THE PRIORITY POLLUTANT LOADINGS FROM THE AIR STRIPPER EFFLUENT WERE HIGH AND SHOULD BE REDUCED PRIOR TO DISCHARGE TO THE GTMUA.

RESPONSE:

THE STUDY RECOMMENDED, BASED ON PROJECTED CONCENTRATION AND PUBLISHED LITERATURE, THAT ONLY ONE PRIORITY POLLUTANT, ZINC, SHOULD BE REDUCED PRIOR TO DISCHARGE TO THE GTMUA. OTHERWISE, THE TREATABILITY STUDY SHOWED THAT THE EFFLUENT FROM THE AIR STRIPPER DOES NOT LEAD TO AN INHIBITION OF THE BIOLOGICAL PROCESSES AT THE GTMUA FACILITY AT THE PROPOSED FLOW RATES.

THE SAMPLE USED FOR THE TREATABILITY STUDY WAS OBTAINED FROM A GALVANIZED STEEL WELL, AND THEREFORE THE ZINC CONCENTRATION COULD BE ERRONEOUS. THE NJDEP INTENDS TO CONDUCT ADDITIONAL STUDIES TO DETERMINE THE ZINC CONCENTRATION IN THE LEACHATE AND IS WORKING WITH THE GTMUA TO DETERMINE WHAT EFFECT, IF ANY, THE ZINC WILL HAVE ON THE GTMUA FACILITY.

THE RECOMMENDED REMEDY STATES THAT PRETREATMENT IS THE PREFERRED TREATMENT METHOD. IF ZINC REMOVAL IS NECESSARY IT WILL BE INCLUDED IN THE TREATMENT SYSTEM.

ISSUE:

HEAVY METALS FROM THE LEACHATE MAY LIMIT THE GTMUA'S SLUDGE DISPOSAL OPTIONS.

RESPONSE:

EPA, NJDEP, AND THE GTMUA ARE WELL AWARE OF THIS FACT AND IT IS A MAJOR FACTOR IN DETERMINING THE EXTENT OF ON-SITE PRE-TREATMENT.

OTHER COMMENTS CONCERNING THE FFS SUBMITTED DURING THE RI/FS COMMENT PERIOD ARE SIMILAR TO THOSE SUBMITTED DURING THE FFS COMMENT PERIOD AND ARE DISCUSSED IN THE FFS RESPONSIVENESS SUMMARY.

- REMEDIAL INVESTIGATION AND FEASIBILITY STUDY

ISSUE:

INFORMATION FROM EPA REGION II'S TECHNICAL ASSISTANCE TEAM (TAT) WAS USED IN THE REMEDIAL INVESTIGATION BUT THE WELL LOGS AND DECONTAMINATION PROCEDURES WERE NOT INCLUDED IN THE REPORT. THIS INFORMATION IS NECESSARY IN ORDER TO DETERMINE THE QUALITY OF THE DATA IN TERMS OF PROPER WELL CONSTRUCTION AND SAMPLING.

RESPONSE:

THE REGION HAS REVIEWED THE TAT DATA IN RELATION TO THE WELL CONSTRUCTION AND DECONTAMINATION PROCEDURES TO VERIFY THE QUALITY OF THE DATA. THE WELLS WERE INSTALLED AND SAMPLED ACCORDING TO THE REGION'S STANDARDS AND PROCEDURES AT THE TIME THEY WERE INSTALLED. EPA BELIEVES THAT THE DATA DOES ACCURATELY SHOW SEVERE GROUNDWATER CONTAMINATION FROM ORGANIC HAZARDOUS SUBSTANCES. THE WELLS HAD GALVANIZED STEEL RISERS AND THE METALS SAMPLES WERE NOT FILTERED. THIS MAY HAVE AFFECTED THE CONCENTRATION OF SOME OF THE METALS. THE NJDEP IS INVESTIGATING THIS POSSIBILITY.

SEVERAL PREVIOUS STUDIES AND REPORTS ARE MENTIONED IN THE RI/FS AND TO INCLUDE ALL OF THEM AS APPENDICES TO THE RI/FS WOULD MAKE IT TOO VOLUMINOUS TO BE USED AS A WORKING DOCUMENT. COPIES OF ALL THE PREVIOUS STUDIES AND REPORTS ARE AND HAVE BEEN AVAILABLE FOR PUBLIC REVIEW IN EPA REGION II'S OFFICES.

ISSUE:

A COMMENTOR NOTED THAT NOT ALL THE CONTAMINANTS THAT WERE MENTIONED AS "HIGH" OR INFERRED AS HIGH, IN THE REMEDIAL INVESTIGATION WERE OVER ESTABLISHED FEDERAL STANDARDS AND CRITERIA.

RESPONSE:

THE WORD "HIGH" IS A RELATIVE TERM. IN THE REMEDIAL INVESTIGATION "HIGH" IS USED RELATIVE TO BACKGROUND CONCENTRATIONS NOT FEDERAL STANDARDS AND CRITERIA.

ISSUE:

THERE WAS A DISCREPANCY BETWEEN THE GEOPHYSICAL SURVEYS OF THE REMEDIAL INVESTIGATION AND A 1981 NJDEP STUDY.

RESPONSE:

SINCE GEOPHYSICAL SURVEYS PROVIDE ONLY A RELATIVELY INACCURATE INDICATION OF THE PRESENCE OF GROUND WATER CONTAMINATION AND ARE SUBJECTIVELY INTERPRETED, DISCREPANCIES WOULD BE EXPECTED.

ISSUE:

THE CONCLUSIONS REACHED IN THE RI ON THE AIR, SURFACE WATER, SOIL AND SEDIMENT APPEAR TO BE ADEQUATELY INTERPRETED.

RESPONSE:

EPA AGREES.

ISSUE:

THE CONCEPTUAL PLANS FOR THE CAP SHOW WIDE BENCHES (12 FEET) FOR STORM WATER RUNOFF CONTROL. THESE WIDE BENCHES HAVE A GREATER POTENTIAL TO BE ADVERSELY AFFECTED BY DIFFERENTIAL SETTLING THAN SMALLER CHANNELS. "MICROTERRACING" (SMALLER BUT MORE FREQUENT CHANNELS) SHOULD BE CONSIDERED FOR THE CAP.

RESPONSE:

EPA AGREES, AND WILL EVALUATE SUCH DETAILS DURING DESIGN.

ISSUE:

THE GAS COLLECTION PIPE PLACED IN THE GRAVEL LAYER OF THE CAP WOULD BE SUBJECT TO CRACKING AND RUPTURING FROM DIFFERENTIAL SETTLING. THE ACTIVE GAS SYSTEM SHOULD COLLECT THE GAS WITH A NUMBER OF VERTICAL PIPES PLACED INTO THE GRAVEL LAYER AND CONNECTED BY A HEADER SYSTEM, WITH FLEXIBLE JOINTS, ABOVE THE LANDFILL COVER.

RESPONSE:

NJDEP WILL EVALUATE ALTERNATIVE ACTIVE GAS COLLECTION SYSTEMS DURING DESIGN.

ISSUES:

THE LANDFILL GAS TREATMENT SYSTEM SHOULD BE CONVERTED TO A GAS RECOVERY SYSTEM WHICH WOULD UTILIZE THE GAS AT AN ENERGY RESOURCE.

RESPONSE:

EPA RECOGNIZES THE GAS AS A POTENTIAL ENERGY RESOURCE, BUT ALSO RECOGNIZES SEVERAL LEGAL AND ADMINISTRATIVE CONSTRAINTS WOULD BE ASSOCIATED WITH GAS RECOVERY. THESE CONSTRAINTS MAY DELAY INSTALLATION OF A GAS RECOVERY SYSTEM FOR AN INORDINATE TIME PERIOD. BECAUSE OF THESE POTENTIAL DELAYS EPA BELIEVES THAT A GAS COLLECTION AND TREATMENT SYSTEM SHOULD BE INSTALLED AS SOON AS POSSIBLE. HOWEVER, WHEN AND IF GAS RECOVERY BECOMES A FEASIBLE ALTERNATIVE, THE INSTALLED SYSTEM CAN READILY BE CONVERTED TO A RECOVERY SYSTEM.

ISSUE:

THE TOE DRAIN AND CAP FOUNDATION SHOULD BE DESIGNED SO THAT THE LEACHATE CAN FLOW UNOBSTRUCTED BY SOIL FROM THE WASTE TO THE TOE DRAIN.

RESPONSE:

EPA AGREES AND WILL EVALUATE THE DESIGN OF THE TOE DRAIN TO ASSURE UNOBSTRUCTED FLOW.

ISSUE:

GROUNDWATER PUMPING WAS THE ONLY GROUNDWATER REMEDIAL ACTION EVALUATED.

RESPONSE:

GROUNDWATER CONTAINMENT BARRIERS WERE ALSO EVALUATED (SECTION 2.3.4 OF THE FEASIBILITY STUDY) AND WERE ELIMINATED IN THE INITIAL SCREENING FOR EFFECTIVENESS AND RELIABILITY REASONS.

ISSUE:

ADDITIONAL GROUNDWATER MODELING FOR THE GROUNDWATER PUMPING SYSTEM SHOULD BE PERFORMED TO EVALUATE THE EFFECTS OF VARIOUS CAPS, PARTIAL SLURRY WALLS AND OTHER REMEDIATION TECHNIQUES.

RESPONSE

THE MODEL USED IN THE STUDY IS ACCEPTABLE FOR FEASIBILITY STUDY PURPOSES. THIS MODEL IS CONSIDERED

CONCEPTUAL AND FURTHER EVALUATION OF THE PUMPING SYSTEM TO OPTIMIZE ITS EFFECTIVENESS WILL BE PERFORMED DURING DESIGN.

ISSUE:

THE GROUNDWATER PUMPING SYSTEM MAY NOT BE NECESSARY AFTER THE SITE IS CAPPED SINCE THE REDUCED INFILTRATION MAY LOWER THE WATER TABLE BELOW THE WASTES.

RESPONSE:

THE PURPOSE OF THE PUMPING SYSTEM IS TO LOWER THE WATER TABLE AND DRAW BACK THE EXISTING PLUME OF CONTAMINANTS MIGRATING OFF-SITE. EVEN IF THE CAP LOWERS THE WATER TABLE THE PLUME WOULD CONTINUE TO MIGRATE.

ISSUE:

THE OPERATION AND MAINTENANCE (O&M) COSTS FOR THE GROUNDWATER TREATMENT SYSTEM IN THE FEASIBILITY STUDY ARE SIGNIFICANTLY LOWER THAN COST ESTIMATES DEVELOPED BY FRED C. HART ASSOCIATES INC. (HART).

RESPONSE:

EPA WAS UNABLE TO EVALUATE THE REASONS FOR THE COST DIFFERENCE SINCE THE BASIS FOR HART'S ESTIMATE IS SIMPLY "REPORTED COSTS".

THE COSTS PRESENTED ARE ESTIMATES AND BENCH SCALE TREATMENT TESTS WILL BE NEEDED TO MORE ACCURATELY ESTIMATE O&M COSTS. EPA BELIEVES THAT THE COSTS PRESENTED ARE WITHIN THE RANGE OF ACCURACY FOR THE FEASIBILITY STUDY.

ISSUE:

THE QUANTITIES AND COSTS FOR THE CAP MATERIALS ARE A SIGNIFICANT EXPENDITURE AND SHOULD BE MORE ACCURATELY DEFINED.

RESPONSE:

EPA BELIEVES THE QUANTITIES AND COSTS FOR THE CAP MATERIALS ARE ADEQUATELY DEFINED IN THE FEASIBILITY STUDY AND ARE WITHIN THE RANGE OF ACCURACY NECESSARY FOR THE FEASIBILITY STUDY.

LEGAL ISSUES

ISSUE:

A NUMBER OF PARTIES COMMENTED THAT THEY DID NOT HAVE A MEANINGFUL OPPORTUNITY TO COMMENT ON THE RI/FS AND TO DECIDE UPON THEIR INVOLVEMENT IN THE REMEDIAL DESIGN AND CLEANUP ACTIVITIES AT THE GEMS SITE.

RESPONSE:

THE RI/FS DOCUMENTS WERE PREPARED FOR THE GEMS SITE IN JULY, 1985. ON AUGUST 1, 1985, NOTICE LETTERS WERE EXPRESS MAILED TO ELEVEN (11) POTENTIALLY RESPONSIBLE PARTIES (PRPS) FOR THE GEMS SITE. THIS LETTER INFORMED EACH OF THOSE PARTIES OF THE FOLLOWING, AMONG OTHER ITEMS:

1. THAT EPA BELIEVED THAT THESE PARTIES WERE PRPS FOR THE GEMS SITE;

2. THAT EPA HAD RECENTLY COMPLETED A RI/FS ON THE GEMS SITE;

3. THAT COPIES OF THE RI/FS DOCUMENTS WERE AVAILABLE FOR THEIR REVIEW AT THE EPA-REGION II OFFICES AND AT FOUR (4) LOCATIONS IN NEW JERSEY STATE;

4. THAT ANY COMMENTS ON THE RI/FS WERE TO BE SUBMITTED NO LATER THAN AUGUST 23, 1985 (THIS DEADLINE WAS

SUBSEQUENTLY EXTENDED TO AUGUST 31, 1985);

5. THAT EPA INTENDED TO SELECT A REMEDIAL ACTION FOR THE GEMS SITE BY MID-SEPTEMBER 1985; AND

6. THAT EPA WOULD ASSUME THAT THE PRPS DID NOT WISH TO UNDERTAKE THE REMEDIAL DESIGN OR REMEDIAL ACTIONS NEEDED FOR THE GEMS SITE IF THEY DID NOT INDICATE A WILLINGNESS TO PERFORM THESE ACTIVITIES TO EPA WITHIN 14 DAYS AFTER RECEIPT OF THE NOTICE LETTER DATED AUGUST 1, 1985.

ON AUGUST 1, 1985, EPA ALSO SENT APPROXIMATELY 500 COPIES OF A PRESS RELEASE TO STATE SENATOR DALTON WHO SUBSEQUENTLY MAILED THEM TO CONSTITUENTS OF THE DISTRICT. THE PRESS RELEASE INDICATED THAT THE RI/FS FOR THE GEMS SITE HAD BEEN COMPLETED AND THAT COPIES WERE AVAILABLE FOR PUBLIC REVIEW AT FOUR (4) NAMED LOCATIONS NEAR THE SITE. IT ALSO NOTED THAT A PUBLIC MEETING WOULD BE HELD CONCERNING THE SITE ON AUGUST 19, 1985 AT THE TOWNSHIP MUNICIPAL BUILDING AND THAT THE PUBLIC COMMENT PERIOD WOULD EXTEND FROM AUGUST 2, 1985 TO AUGUST 23, 1985.

ON AUGUST 2, 1985, EPA SENT A PRESS RELEASE TO FOUR (4) LOCAL NEWSPAPERS AT LEAST TWO (2) OF WHICH SUBSEQUENTLY PUBLISHED THE RELEASE CONTAINING THE INFORMATION NOTED ABOVE.

ON AUGUST 19, 1985, EPA HELD A PUBLIC MEETING CONCERNING THE SITE AT THE GLOUCESTER TOWNSHIP MUNICIPAL BUILDING WHICH APPROXIMATELY 150 PERSONS ATTENDED, INCLUDING THE COUNSEL FOR GEMS, INC. (AND ITS PRINCIPALS) AND THE COUNSEL FOR GLOUCESTER TOWNSHIP. EPA INFORMED THE PARTIES AT SAID MEETING THAT THE DEADLINE FOR COMMENTS ON THE RI/FS WOULD BE EXTENDED TO AUGUST 31, 1985.

EPA OFFICIALS SUBSEQUENTLY MET WITH REPRESENTATIVES OF OWENS-CORNING FIBERGLAS, INC., E.I. DUPONT DE NEMOURS, INC, AND ROHM AND HAAS, INC. ON SEPTEMBER 10, 1985 TO DISCUSS THE GEMS SITE.

ALTHOUGH COPIES OF THE RI/FS WERE AVAILABLE FOR REVIEW AT FOUR (4) LOCAL REPOSITORIES AND AT THE NJDEP (TRENTON, NEW JERSEY) AND EPA-REGION II (NEW YORK, NEW YORK) OFFICES, STARTING ON AUGUST 2, 1985, EPA-REGION II ALSO MAILED COPIES OF THE RI/FS TO FOUR (4) PRPS WHO REQUESTED COPIES AFTER THAT DATE.

IN ADDITION TO THE AFOREMENTIONED ACTIVITIES, BOTH EPA AND NJDEP HAVE CONDUCTED AN EXTENSIVE COMMUNITY RELATIONS PROGRAM FROM 1983 LEADING UP TO THE DEVELOPMENT OF THE DRAFT RI/FS IN JULY 1985. THESE ACTIVITIES INCLUDED LOCAL SURVEYS IN THE SPRING OF 1983, PERIODIC DISSEMINATION OF INFORMATION TO GLOUCESTER TOWNSHIP OFFICIALS THROUGHOUT 1983 AND 1984, PUBLIC MEETINGS ON APRIL 11 AND MAY 2, 1985 AND SOLICITATION OF COMMENTS ON THE FOCUS FEASIBILITY STUDY IN MAY 1985.

THROUGHOUT THE DEVELOPMENT OF THE RI/FS AND AFTER THE NOTIFICATION OF ITS COMPLETION ON AUGUST 1, 1985 EPA HAS OFFERED BOTH THE PUBLIC AND THE PRPS FOR THE GEMS SITE A MEANINGFUL OPPORTUNITY TO COMMENT ON ENVIRONMENTAL ISSUES INVOLVED IN THE REMEDIAL ALTERNATIVES EVALUATED FOR THE SITE.

ISSUE:

THE CITY OF PHILADELPHIA WHICH ALLEGEDLY DISPOSED OF SLUDGES OR OTHER WASTE MATERIAL AT THE GEMS SITE SHOULD NOT BE A RESPONSIBLE PARTY SUBJECT TO LIABILITY UNDER THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA) 42 U.S.C. 9601 ET. SEQ., WHERE:

A) THE SLUDGE IS NOT A HAZARDOUS WASTE UNDER RCRA;

B) THE LEVEL OF HAZARDOUS CONSTITUENTS IN THE SLUDGE ARE BELOW "PERTINENT MAXIMUM CONTAMINANT LEVELS", ESTABLISHED UNDER RCRA;

C) THE LIKELIHOOD OF THE SLUDGE LEACHING AT THE SITE IS NEGLIGIBLE; AND

D) THE PRESENCE OF THE SLUDGE AT THE GEMS SITE WOULD NOT AFFECT THE MANNER OR COST OF CLOSURE OF THE LANDFILL.

ANSWER:

MUNICIPAL PARTIES AND OTHER GOVERNMENTAL ENTITIES ARE "PERSONS" UNDER SECTION 101 (21) OF CERCLA AND MAY ALSO BE LIABLE PARTIES UNDER SECTION 107(A). EPA BELIEVES THAT THE CITY OF PHILADELPHIA IS A POTENTIALLY RESPONSIBLE PARTY WHICH IS SUBJECT TO JOINT AND SEVERAL LIABILITY FOR RESPONSE COSTS INCURRED BY EPA AT THE GEMS SITE UNDER SECTION 107(A) REGARDLESS OF THE FACTORS NOTED ABOVE.

ISSUE:

THE EPA NOTICE LETTER TO THE PRPS DATED AUGUST 1, 1985, MAKES NO MENTION OF HOW THE AGENCY INTENDS TO COMPLY WITH 104(C)(3).

ANSWER:

THERE IS NO STATUTORY OR REGULATORY REQUIREMENTS THAT EPA DESCRIBE HOW IT INTENDS TO COMPLY WITH SECTION 104(C)(3) IN NOTICE LETTERS TO PRPS.

ISSUE:

EPA ITSELF HAS ACKNOWLEDGED THAT "THERE IS NO QUESTION THE STATE OF NEW JERSEY IS OBLIGATED TO PROVIDE FUNDING FOR WELL OVER FIFTY PERCENT OF THE COST OF THE CLEANUP OF THE GEMS SITE.".

ANSWER:

EPA HAS NEVER TAKEN THE POSITION EITHER OFFICIALLY OR UNOFFICIALLY THAT THE STATE OF NEW JERSEY IS OR SHOULD BE OBLIGATED TO PROVIDE FOR MORE THAN FIFTY PERCENT (50%) OF THE TOTAL COSTS FOR THE CLEANUP OF THE GEMS SITE.

GEMS
FOCUSED FEASIBILITY STUDY (FFS)
RESPONSIVENESS SUMMARY
FOR MAY 1985 COMMENT PERIOD

TOPIC

A. PUBLIC COMMENT PERIOD

ISSUE:

THE CLOSING DATE OF MAY 17, 1985 FOR PUBLIC COMMENT IS TOO LIMITED.

DISCUSSION:

CURRENT EPA POLICY REQUIRES A MINIMUM TWO WEEK (14 DAY) COMMENT PERIOD FOR AN INITIAL REMEDIAL MEASURE (IRM). THE TOWNSHIP RECEIVED A COPY OF THE FOCUSED FEASIBILITY STUDY (FFS) ON APRIL 29, 1985, 19 DAYS PRIOR TO THE CLOSE OF THE COMMENT PERIOD. THE FINDINGS OF THE FFS WERE PRESENTED AT A PUBLIC MEETING ON MAY 2, 1985, 15 DAYS PRIOR TO THE CLOSE OF THE COMMENT PERIOD. EPA HAS ACCEPTED AND ADDRESSED ADDITIONAL COMMENTS ON THE FFS DURING THE RI/FS COMMENT PERIOD.

ISSUE:

SEVERAL PEOPLE INDICATED THAT THE MAY 2, 1985 PUBLIC MEETING WAS NOT SUFFICIENTLY ADVERTISED.

DISCUSSION:

LOCAL AND STATE OFFICIALS WERE NOTIFIED OF THE MEETING DURING THE WEEK PRIOR TO THE MEETING. THE MAYOR ANNOUNCED THE MAY 2ND MEETING AT A TOWN MEETING HELD THE WEEK BEFORE. THE CAMDEN CURRIER POST, A LOCAL DAILY NEWSPAPER, WAS INFORMED OF THE MEETING ON APRIL 30. EPA CANNOT CONTROL HOW OR IF NEWSPAPERS REPORT NOTICES OF UPCOMING MEETINGS. EPA'S NOTICES TO THE LOCAL AND STATE OFFICIALS AND THE LOCAL NEWSPAPER IS CONSIDERED

ADEQUATE NOTIFICATION.

B. REMEDIAL INVESTIGATION DATA

ISSUE:

THE DATA GATHERED AND SUBSEQUENTLY EVALUATED TO DETERMINE THE NEED FOR AN IRM WAS NOT PRESENTED.

DISCUSSION:

THE DATA USED TO ESTABLISH THE NEED FOR AN IRM IS CONTAINED IN SEVERAL DOCUMENTS IN EPA'S FILES. DATA RELATED TO NJDEP'S AIR SAMPLING WAS PRESENTED AT THE APRIL 11, 1985 PUBLIC INFORMATION SESSION HELD BY THE NJDEP AND EPA AT THE GLOUCESTER TOWNSHIP MUNICIPAL BUILDING. THAT DATA AND THE OTHER DATA USED ARE AND HAVE BEEN AVAILABLE TO THE PUBLIC UPON REQUEST.

ISSUE:

THE DATA USED TO DETERMINE THE NEED FOR THE ACTION MUST SATISFY CERTAIN CRITERIA OUTLINED IN SECTION 104(C)(1) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA).

DISCUSSION:

SECTION 104(C)(1) REFERS TO REMOVAL ACTIONS, NOT REMEDIAL ACTIONS. AN IRM IS A FORM OF REMEDIAL ACTION, AND SO IS NOT LIMITED BY THE CRITERIA OF SECTION 104(C)(1). THE ACTION EPA IS PROPOSING IN THIS STUDY IS AN INITIAL REMEDIAL MEASURE TAKEN PURSUANT TO 40 CFR PART 300.68 AND IS CONSIDERED CONSISTENT WITH THAT SECTION.

ISSUE:

THE ACTION IS BEING TAKEN BECAUSE OF AN "INFERRED AIR POLLUTION PROBLEM".

DISCUSSION:

THE DATA INDICATES AIR QUALITY IN THE AREA IS, OVERALL, SIMILAR TO THAT OF A HEAVILY INDUSTRIALIZED URBAN AREA. SINCE THE SITE IS NOT A HEAVILY INDUSTRIALIZED AREA THE DATA INDICATES AN AIR POLLUTION PROBLEM. ALTHOUGH THE DATA DOES NOT INDICATE AN IMMEDIATE ACTION IS NECESSARY, EPA BELIEVES THE DATA DOES INDICATE A THREAT OF EXPOSURE TO A SIGNIFICANT HEALTH HAZARD.

ISSUE:

SINCE THE RECENT REPORTS OF NOSEBLEEDS HAVE NOT YET BEEN ATTRIBUTED TO THE SITE, AND IF ATTRIBUTABLE, MAY BE RELATED TO SUBSTANCES NOT BEING ADDRESSED BY THE IRM, THEY SHOULD NOT BE USED AS A BASIS FOR IMPLEMENTING THE IRM.

DISCUSSION:

THE RECENT REPORTS OF NOSEBLEEDS ARE NOT THE SOLE BASIS FOR IMPLEMENTING THE IRM. EPA IS OF THE OPINION THAT SUBSTANCES RELEASED FROM THE LANDFILL AND TO BE REMOVED BY THE IRM MAY BE DETERMINED TO BE THE CAUSE OF THE NOSEBLEEDS. THEREFORE, THE REPORTS OF NOSEBLEEDS SUPPORT, BUT ARE NOT THE SOLE BASIS OF, THE DETERMINATION THAT THE VOLATILE CHEMICALS ENTERING THE ENVIRONMENT FROM THE STUDY AREA REPRESENT A THREAT OF EXPOSURE TO A SIGNIFICANT HEALTH HAZARD.

FEASIBILITY STUDY

ISSUE:

THE NJDEP AND EPA IRMS APPEAR INCONSISTENT.

DISCUSSION:

THE NJDEP AND EPA IRMS ARE NOT INCONSISTENT AND ARE CONSIDERED TECHNICALLY EQUIVALENT FOR THE RELOCATION OF HOLLY RUN AND THE GROUNDWATER RECOVERY AND TREATMENT SYSTEMS. THE APPEARANCE OF INCONSISTENCY MAY STEM FOR THE USE OF DIFFERENT TECHNIQUES IN ACHIEVING THE SAME GOAL. THE IRMS DO DIFFER SIGNIFICANTLY IN THE EXTENT OF GRADING AND COVERING BEING PROPOSED. THE IRMS ARE CONSISTENT IN THAT THEY BOTH WILL ACHIEVE THE DESIRED GOAL OF REMOVING THE CONTAMINANTS FROM HOLLY RUN AND, THEREFORE, WILL ELIMINATE THE THREAT TO PUBLIC HEALTH AND THE ENVIRONMENT. FURTHER DISCUSSION OF THIS IS PRESENTED IN THE STAFF SUMMARIES UNDER THE STATE ACTION SECTION.

ISSUE:

THE NEED FOR A VAPOR PHASE CARBON SYSTEM TO TREAT THE AIR STRIPPER OFF-GASES IS NOT NECESSARY SINCE THE POUNDS PER DAY EMISSIONS OF VOLATILE ORGANIC COMPOUNDS ARE NOT GREAT ENOUGH TO WARRANT THE CARBON AND ARE EQUIVALENT TO EMISSIONS FROM A COIN OPERATED COMMERCIAL DRY CLEANING SHOP.

DISCUSSION:

ONE OBJECTIVE OF THE IRM IS TO ELIMINATE THE POTENTIAL THREAT TO THE PUBLIC HEALTH FROM VOLATILE ORGANIC COMPOUNDS (VOCS), WHICH ARE CURRENTLY BEING GROUNDWATER/LEACHATE TREATMENT SYSTEM REDUCE THE RELEASE OF THE VOCS TO THE ATMOSPHERE AND THEREFORE, THE CARBON UNITS ARE ESSENTIAL TO ACCOMPLISHING THE GOAL OF THE ACTION. IN ADDITION, THE NJDEP, PURSUANT TO NJAC 7:27-8, REQUIRES AN AIR DISCHARGE PERMIT FOR AN AIR STRIPPER SYSTEM WHEN THE INFLUENT TOTAL VOLATILE ORGANIC COMPOUNDS (TVOC) CONCENTRATION EXCEEDS 0.1 PARTS PER MILLION (PPM). THE TVOC CONCENTRATION IN THE SAMPLE INFLUENT TO THE SYSTEM IS 32 PPM. THIS ESTABLISHES THE NEED FOR THE PERMIT. THE NJDEP PERMIT CRITERIA REQUIRE THAT THE OFF-GAS EMISSIONS BE CONTROLLED IF, AMONG OTHER CRITERIA, THE INFLUENT CONTAINS MORE THAN 1 PPM OF BENZENE. THE INFLUENT SAMPLE USED IN THE TREATABILITY STUDY FOR THE SYSTEM CONTAINED 1.65 PPM OF BENZENE. THIS DICTATES THAT CONTROL OF THE OFF-GAS WILL BE REQUIRED. THE DEGREE OF CONTROL IS DICTATED BY STATE-OF-THE-ART TECHNOLOGY. CARBON ADSORPTION IS STATE-OF-THE-ART TECHNOLOGY.

ANOTHER FACTOR IN THE CRITERIA THAT THE STATE USES TO DETERMINE IF OFF-GAS CONTROL IS NECESSARY IS WHEN THE TVOC IN THE OFF-GASES ARE GREATER THAN 3.5 POUNDS PER HOUR (LB/HR). ASSUMING THAT THE COMMENTORS' CALCULATIONS ARE CORRECT, THE AVERAGE HOURLY EMISSIONS OF TVOC WOULD BE LESS THAN 3.5 LBS/HR. HOWEVER, THE SYSTEM IS REQUIRED TO HAVE CONTROL OF THE OFF-GAS IF ANY ONE OF THE CRITERIA IS EXCEEDED, SPECIFICALLY THE INFLUENT BENZENE CONCENTRATION.

ISSUE:

WHY NOT RELOCATE THE RESIDENTS LIVING NEAR THE LANDFILL UNTIL THE LONG-TERM REMEDY IS COMPLETE AT THE LOCAL SEWAGE TREATMENT PLANT.

DISCUSSION:

RELOCATING RESIDENTS WOULD REMOVE THE THREAT OF SIGNIFICANT PUBLIC EXPOSURE BUT WOULD NOT REDUCE OR ELIMINATE THE THREAT TO THE ENVIRONMENT. THE PURPOSE OF THE IRM IS TO REDUCE OR ELIMINATE THE THREAT TO THE PUBLIC HEALTH AND THE ENVIRONMENT. RELOCATING RESIDENTS HAS OTHER CONSTRAINTS ASSOCIATED WITH IT. EPA LACKS AUTHORITY TO RELOCATE RESIDENTS IN THE ABSENCE OF AN IMMEDIATE THREAT TO HUMAN LIFE OR HEALTH. ALTHOUGH THE DATA SHOWS A POTENTIAL HEALTH HAZARD THE DATA DOES NOT INDICATE AN IMMEDIATE HEALTH HAZARD EXISTS, NOR HAS A PUBLIC HEALTH EMERGENCY BEEN DECLARED.

C. RECOMMENDED ALTERNATIVE

ISSUE:

THE WORKERS AT THE SEWAGE TREATMENT PLANT AND RESIDENTS NEAR THE PLANT WERE CONCERNED THAT THE PRETREATED LEACHATE WOULD PRESENT A HAZARD TO THEM.

DISCUSSION:

EXTENSIVE COMMENTS FROM THE WORKERS AT THE SEWAGE TREATMENT PLANT AND THE RESIDENTS WHO LIVE NEAR THE PLANT WERE DISCUSSED AT THE MAY 2ND PUBLIC MEETING. THE UNDERLYING CONCERN IN ALL THE COMMENTS WAS THAT THE LEACHATE WOULD PRESENT A HAZARD TO THE WORKERS AND THE NEARBY RESIDENTS.

THE PRETREATMENT UNIT WAS CONCEPTUALLY DESIGNED BASED ON A TREATABILITY STUDY OF THE LEACHATE BY PRINCETON AQUA SCIENCE. THE TREATABILITY STUDY DETERMINED THAT THE AIR STRIPPER WOULD REMOVE ALL VOLATILE PRIORITY POLLUTANT HAZARDOUS SUBSTANCES TO NON-DETECTABLE LEVELS, EXCEPT FOR METHYLENE CHLORIDE (PRESENT AFTER AIR STRIPPING AT 15 UG/L) AND 1,4-DICHLOROBENZENE (PRESENT AFTER AIR STRIPPING AT 402 UG/L).

EPA IS OF THE OPINION THAT THESE COMPOUNDS WOULD NOT PRESENT A HAZARD TO THE WORKERS OR NEARBY RESIDENTS SINCE THEY WOULD BE AT RELATIVELY LOW CONCENTRATIONS AND HAVE PERMISSIBLE EXPOSURE LIMITS, SET BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH, FAR GREATER THAN THE CONCENTRATIONS EXPECTED AT THE TREATMENT PLANT.

THE RECOMMENDED ALTERNATIVE INCLUDES PRETREATMENT AND DISCHARGE TO THE POTW AS THE PREFERRED TREATMENT OPTION. HOWEVER, THE NEW JERSEY DEPARTMENT OF HEALTH (NJDOH) IS INVESTIGATING WHAT POTENTIAL HAZARDS, IF ANY, THE PRETREATED LEACHATE COULD PRESENT TO THE WORKERS AND NEARBY RESIDENTS. THE FINDINGS OF THE NJDOH INVESTIGATION WILL BE A MAJOR FACTOR IN DETERMINING THE TREATMENT OPTION.

ISSUE:

THE INITIAL REMEDIAL MEASURE SHOULD BE CONSISTENT WITH THE OVERALL REMEDIAL ACTION SO THAT MONEY IS NOT WASTED.

DISCUSSION:

EPA REGULATIONS (40 CFR 300.68) REQUIRE ALL REMEDIAL ACTIONS, INCLUDING INITIAL REMEDIAL ACTIONS, BE CONSISTENT WITH THE PERMANENT REMEDY. DISCUSSION OF THE CONSISTENCY ISSUE IS PRESENTED IN THE STAFF SUMMARIES.

ISSUE:

IF SOMETHING (E.G. UNCONTROLLED RELEASES) SHOULD HAPPEN DURING THE CONSTRUCTION OR OPERATION OF THE TREATMENT SYSTEM, WILL THERE BE EVACUATION PLANS FOR THE AREA.

DISCUSSION:

THE LEVELS OF VOLATILE ORGANIC COMPOUNDS RELEASED DURING CONSTRUCTION ARE NOT EXPECTED TO SIGNIFICANTLY INCREASE THE POTENTIAL THREAT TO THE PUBLIC, BUT CONTINUOUS MONITORING WILL BE PERFORMED DURING CONSTRUCTION. EMERGENCY PLANS, WHICH MAY INVOLVE EVACUATION PROCEDURES FOR NEARBY RESIDENTS, ARE ROUTINELY PREPARED FOR ALL REMEDIAL ACTIONS. SHOULD THE MONITORING INDICATE EVACUATION IS NECESSARY, THE EMERGENCY PLANS WOULD BE IMPLEMENTED.

DURING THE OPERATION OF THE PRETREATMENT PLANT, CONTINUOUS MONITORING OF THE SYSTEM WILL BE AUTOMATICALLY PERFORMED. IF A FAILURE IN THE SYSTEM, WHICH COULD LEAD TO A RELEASE, OCCURS, THE ENTIRE SYSTEM WOULD BE IMMEDIATELY SHUT DOWN TO PREVENT ANY UNCONTROLLED RELEASE. THE COMPONENTS OF THE PRETREATMENT SYSTEM REQUIRE THE FORCED MOVEMENT OF CONTAMINATED MATERIALS EITHER THROUGH PUMPS OR BLOWERS AND FANS. SIMPLY SHUTTING OFF THE POWER TO THOSE PUMPS AND FANS WILL PREVENT AN UNCONTROLLED RELEASE.

ISSUE:

WHY NOT DELAY THE IRM UNTIL THE OVERALL ACTION IS DETERMINED, TO ENSURE CONSISTENCY OF THE IRM WITH THE OVERALL ACTION, SINCE THE OVERALL ACTION IS EXPECTED TO BE ANNOUNCED WITHIN THE NEXT TWO MONTHS (JULY 1985).

DISCUSSION:

THE RECOMMENDED LONG-TERM (OVERALL) ACTION HAS BEEN ANNOUNCED AND THE IRM IS CONSISTENT WITH THE LONG-TERM ACTION. HOWEVER, EPA DID NOT DELAY THE IRM TO ENSURE CONSISTENCY IN RESPONSE TO THIS COMMENT. THE IRM AND LONG-TERM ACTION ARE NOW BEING IMPLEMENTED TOGETHER, ONLY BECAUSE OF SCHEDULE AND IMPLEMENTATION CHANGES BY NJDEP HAS ALLOWED THE SCHEDULES TO COINCIDE.

D. ENFORCEMENT

ISSUE:

THE TOWNSHIP EXPRESSED CONCERN THAT EPA HAS NOT CONDUCTED A SEARCH FOR GENERATORS OF WASTE DISPOSED AT THE LANDFILL.

DISCUSSION:

FOR THE PAST TWO YEARS EPA HAS BEEN PERFORMING A SEARCH FOR GENERATORS AND TRANSPORTERS OF WASTES DISPOSED AT THE GEMS LANDFILL. THAT SEARCH HAS INCLUDED EXTENSIVE FILE REVIEWS AT THE STATE, LOCAL AND FEDERAL LEVELS; INTERVIEWS AND ISSUANCE OF INFORMATION REQUEST LETTERS TO POSSIBLE GENERATORS AND TRANSPORTERS. MOREOVER, EPA HAS TRACKED THE EXTENSIVE DISCOVERY THAT HAS BEEN CONDUCTED DURING JUDICIAL ACTIONS CONCERNING THE SITE. EPA HAS IDENTIFIED SEVERAL POTENTIALLY RESPONSIBLE PARTIES (PRPS) AND HAS SENT THEM NOTICE LETTERS AFFORDING THEM THE OPPORTUNITY TO PERFORM THE IRM. THE SEARCH FOR ADDITIONAL (PRPS) IS CONTINUING.

GENERAL PUBLIC REACTION

THE GENERAL PUBLIC REACTION TO THE IRM AT THE MAY 2, 1985 MEETING APPEARED TO BE DIVIDED INTO THREE CATEGORIES.

THE PROPOSED IRM WAS RECEIVED FAVORABLY BY THE RESIDENTS WHO LIVE NEAR THE LANDFILL. THE WORKERS FROM THE SEWAGE TREATMENT PLANT AND RESIDENTS WHO LIVE NEAR THE PLANT STRONGLY AND REPEATEDLY OPPOSED THE DISCHARGE OF THE PRETREATED LEACHATE TO THE SEWAGE TREATMENT PLANT. THE THIRD GROUP APPEARED TO BE COMPOSED OF TOWNSHIP RESIDENTS WHO DO NOT LIVE NEAR THE LANDFILL. THIS GROUP SEEMS TO BE FAVORABLE TO THE IRM BUT BECAME SKEPTICAL AFTER THE TOWNSHIP ATTORNEY INDICATED THAT THE TOWNSHIP, AS A POTENTIAL RESPONSIBLE PARTY, MAY BE LIABLE FOR THE COST OF THE ACTION.

AS A RESULT OF THE APRIL 11 AND MAY 2, 1985 MEETINGS, EPA BELIEVES THAT THE LOCAL GENERAL PUBLIC SUPPORTS THE FACT THAT ACTION SHOULD BE TAKEN AT THE SITE AS SOON AS POSSIBLE. BASED ON THE COMMENTS RECEIVED THERE SEEMS TO BE SOME DISAGREEMENT WITH SPECIFIC ASPECTS OF THE IRM. NEGATIVE COMMENTS ON THE ACTION, AS A WHOLE, WERE LIMITED TO A SUGGESTION TO RELOCATE THE RESIDENTS NEARBY INSTEAD OF INITIATING THE IRM, AND POSTPONING THE IRM UNTIL THE OVERALL REMEDY IS KNOWN.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

SEPTEMBER 25, 1985

MR. ARNOLD W. CASLIN SR
306 FRONT STREET
GLENDORA, NEW JERSEY 08029

DEAR MR. CASLIN:

THANK YOU FOR YOUR COMMENTS REGARDING THE ENVIRONMENTAL PROTECTION AGENCY'S (EPA'S) RECOMMENDED REMEDIAL ACTION FOR THE GLOUCESTER ENVIRONMENTAL MANAGEMENT SERVICES (GEMS) LANDFILL SITE. SPECIFICALLY, YOU HAVE EXPRESSED CONCERN ABOUT THE DISCHARGE OF PRETREATED LEACHATE TO THE GLOUCESTER TOWNSHIP MUNICIPAL UTILITIES AUTHORITY (GTMUA) TREATMENT PLANT IN CHEWS LANDING. THE CONCERNS OF THE CITIZENS IN THE COMMUNITIES AFFECTED BY SUPERFUND SITES ARE OF THE UTMOST IMPORTANCE TO OUR PROGRAM AND THE DECISIONS WE MAKE TO CLEAN UP THESE SITES.

WE UNDERSTAND YOUR CONCERN FOR YOUR HEALTH AND THE HEALTH OF YOUR NEIGHBORS AND WE SHARE THAT CONCERN. PLEASE BE ASSURED THAT WE WOULD NOT CONSIDER ALLOWING THE PRETREATED LEACHATE TO BE DISCHARGED TO THE GTMUA IF WE BELIEVED THAT IT PRESENTED A HEALTH HAZARD TO YOU OR YOUR NEIGHBORS. THE CHEMICALS YOU REFERRED TO AS POISONS ARE CONSIDERED HAZARDOUS SUBSTANCES. THESE SUBSTANCES CAN ONLY BE HARMFUL IF YOU ARE EXPOSED TO THEM AT SIGNIFICANT LEVELS OR CONCENTRATIONS. THE MOST SIGNIFICANT ARE THE VOLATILE ORGANIC CHEMICALS (TOLUENE, BENZENE, CHLOROBENZENE, ETC.). THE PRETREATMENT SYSTEM WHICH WOULD BE CONSTRUCTED AT THE GEMS LANDFILL SITE WILL REDUCE THE LEVELS OF THESE CHEMICALS TO INSIGNIFICANT AMOUNTS BEFORE THE LEACHATE WOULD BE DISCHARGED TO THE GTMUA PLANT. EPA FIRMLY BELIEVES THAT THE PRETREATED LEACHATE WOULD NOT ADVERSELY AFFECT THE HEALTH OF YOU, YOUR NEIGHBORS, OR THE WORKERS AT THE GTMUA PLANT.

IN ADDITION, BECAUSE OF YOUR CONCERNS AND THE CONCERNS OF THE WORKERS AT THE PLANT, THE NEW JERSEY DEPARTMENT OF HEALTH (NJDOH) IS CONDUCTING AN INDEPENDENT EVALUATION TO DETERMINE IF THE PRETREATED LEACHATE PRESENTS A HAZARD TO THE WORKERS AT THE PLANT OR TO THE NEARBY PUBLIC. THE EVALUATION BY THE NJDOH AND OTHER CONSIDERATIONS, WHICH INCLUDE THE EFFECTS THE PRETREATED LEACHATE WILL HAVE ON GTMUA'S BIOLOGICAL TREATMENT PROCESS AND THE INCINERATION OF THE SLUDGE, WILL BE REVIEWED BY EPA, THE STATE, GTMUA, THE WORKERS, THE TOWNSHIP OFFICIALS, AND THE CITIZENS OF GLOUCESTER TOWNSHIP TO DETERMINE IF DISCHARGING THE PRETREATED LEACHATE TO THE GTMUA IS THE APPROPRIATE TREATMENT OPTION.

IN RESPONSE TO YOUR QUESTIONS REGARDING WHO WOULD BE RESPONSIBLE IF SOMEONE WERE TO BECOME ILL, WE CAN ONLY REITERATE THAT WE BELIEVE THAT THE DISCHARGE OF THE PRETREATED LEACHATE TO THE GTMUA SEWAGE TREATMENT PLANT WILL NOT ADVERSELY AFFECT THE HEALTH OF YOU, THE WORKERS, OR YOUR NEIGHBORS. ALSO, WE CAN ONLY STATE THAT EPA, THE NJDEP AND THE GTMUA WILL BE RESPONSIBLE FOR THE DECISION TO SEND THE PRETREATED LEACHATE TO THE TREATMENT PLANT. IF THAT IS THE DECISION, THE STATE OF NEW JERSEY WILL BE RESPONSIBLE FOR THE OPERATION AND MAINTENANCE OF THE ON-SITE TREATMENT PLANT.

THANK YOU AGAIN FOR YOUR COMMENTS. IF YOU HAVE ANY QUESTIONS, PLEASE FEEL FREE TO CONTACT ME AT THE ABOVE ADDRESS OR CONTACT ME AT (212) 264-1873.

SINCERELY YOURS,

EDWARD PUTNAM
SOUTHERN NEW JERSEY REMEDIAL ACTION SECTION.

ARNOLD W. CASLIN SR
306 FRONT STREET
GLENDORA, N.J. 08029
AUGUST 31, 1985

ED PUTNAM, PROJECT MANAGER
GEMS LANDFILL SITE
U.S. EPA REGION 2
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

DEAR MR. PUTNAM:

WE ARE WRITING TO STATE THAT WE ARE AGAINST HAVING THE RUN-OFF WATERS FROM THE GEM LANDFILL IN ERIAL, SENT TO THE CHEWS LANDING MUA FOR TREATMENT. IN DOING THIS YOU ARE ONLY TRANSMITTING PROBLEMS WITH POISON CHEMICALS (SUCH AS IRON, ALUMINUM, MANGANESE, VOLATILES, LEAD, CHROMIUM, NICKEL, ARSENIC, BASE/NEUTRAL EXTRACTABLE) AND OTHER POISONS SUCH AS TOLUENE, BENZENE, CHLOROBENZENE, ETHYL BENZENE, XYLENES, CADMIUM, CHLORIDES, 4METHYL 2 PENTANONE FROM ONE AREA TO ANOTHER. YOU WILL BE HELPING THE PEOPLE OF ERIAL AND CAUSING PROBLEMS FOR CHEWS LANDING, PINE RUN AND GLENDORA AREAS.

HOW DO WE KNOW WHAT CHANGES WILL HAPPEN WITH THE CHEMICALS, (WHAT IS PRESENT IN THE WATERS THERE NOW), MIXED WITH THE CHEMICALS FROM THE MUA. ALSO, WHEN THEY BURN THE SLUDGE WHAT FUMES WILL BE PUT INTO THE AIR, AND WHAT DAMAGE WILL THEY DO TO THE PEOPLE.

ANOTHER QUESTION NEEDING AN ANSWER IS; WHO WILL BE RESPONSIBLE (STATE OR FEDERAL GOVERNMENTS, WHO ARE ORDERING THE RUN-OFF WATERS OF THE GEM'S LANDFILL INTO THE CHEWS LANDING MUA FOR TREATMENTS) IF ANY OF THE PEOPLE, CHILDREN, ADULTS OR TO THE UNBORN CHILDREN OF THIS GENERATION OR HOW LONG INTO THE FUTURE GENERATIONS COULD PROBLEMS BE CAUSED BY TRANSFERRING THESE WATERS TO THE MUA FOR TREATMENT. OR IF THE PEOPLE OF CHEWS LANDING, PINE RUN OR GLENDORA BECOME ILL OR DEVELOP DISEASE FROM THESE WATERS BEING TREATED AT THE MUA OR IN THE NEAR FUTURE THE BURNING OF THE SLUDGE, WHO WILL BE RESPONSIBLE. WE FEEL THAT THE STATE AND/OR FEDERAL GOVERNMENTS SHOULD BE RESPONSIBLE AND NOT THE MANUFACTURERS OF THE CHEMICALS BECAUSE THE FEDERAL AND STATE GOVERNMENTS ARE ORDERING THIS TO BE DONE.

PLEASE KEEP ME INFORMED AS TO WHAT IS GOING TO BE DONE.

YOURS FOR THE PEOPLE,

ARNOLD W. CASLIN SR

CC: PRESIDENT REAGAN
    GOVERNOR KEAN
    MAYOR ANN MULLEN
    PRESIDENT OF TOWNSHIP GLOUCESTER COUNCIL
    MUA CHEWS LANDING
    US CONGRESSMAN FLORIO
    US SENATOR BRADLEY
    STATE SENATOR DALTON
    STATE ASSEMBLYMEN RILEY
    TEAMSTER LOCAL FOR MUA WORKERS
    FILE.

BLANK, ROME, COMISKY & MCCAULEY

SEPTEMBER 3, 1985

EDWARD PUTNAM
GEMS SITE PROJECT MANAGER
SITE INVESTIGATION AND COMPLIANCE BRANCH
EMERGENCY AND REMEDIAL RESPONSE DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY - REGION II
26 FEDERAL PLAZA
NEW YORK, NY 10278

RE: GLOUCESTER ENVIRONMENTAL MANAGEMENT SERVICES, INC., (GEMS) LANDFILL, GLOUCESTER TOWNSHIP, CAMDEN COUNTY, NEW JERSEY

DEAR MR. PUTNAM:

ON BEHALF OF THE TOWNSHIP OF GLOUCESTER, WE ARE SUBMITTING COMMENTS ON THE DRAFT REMEDIAL INVESTIGATION REPORT AND DRAFT FEASIBILITY STUDY FOR THE GEMS LANDFILL, WHICH ARE HEREINAFTER COLLECTIVELY REFERRED TO AS THE "DRAFT RI/FS".

INITIALLY, WE WISH TO CONFIRM THAT THE TOWNSHIP, THROUGH ITS REPRESENTATIVES, PREVIOUSLY REQUESTED AUTHORIZATION TO CONDUCT THE RI/FS BUT THE REQUEST WAS DENIED BECAUSE, AMONG OTHER THINGS, EPA DID NOT APPROVE THE SCOPE OF THE TOWNSHIP'S PROPOSED STUDY AND BECAUSE THE TOWNSHIP WOULD NOT SUBMIT TO EPA'S DEMAND THAT AS A CONDITION TO BEING PERMITTED TO CONDUCT THE RI/FS, THE TOWNSHIP WOULD HAVE TO AGREE TO FINANCE AND INSTALL WHATEVER REMEDY OR REMEDIES MIGHT BE RECOMMENDED OR REQUIRED AT THE CONCLUSION OF THE STUDY. WITH REGARD TO THE LATTER ITEM, IT IS THE TOWNSHIP'S POSITION THAT IT COULD NOT MAKE ANY BINDING COMMITMENT TO FINANCE AND INSTALL SUCH REMEDIES WHEN THEY WERE NOT YET IDENTIFIED AND THE COST OF SUCH REMEDIES WERE UNKNOWN. IT IS ALSO THE TOWNSHIP'S POSITION THAT IT SHOULD NOT BE HELD RESPONSIBLE FOR THE INVESTIGATORY COSTS AND CLEANUP COSTS FOR THIS SITE AND THAT SUCH COSTS SHOULD BE PAID BY THE STATE OF NEW JERSEY, THE SITE OPERATORS, AND THE COMPANIES THAT GENERATED, TRANSPORTED AND DISPOSED OF HAZARDOUS SUBSTANCES AT THE LANDFILL WITHOUT AUTHORIZATION FROM THE TOWNSHIP. WE BELIEVE ANY DEFICIENCY SHOULD THEN BE BORNE BY THE SUPERFUND.

AFTER IT WAS PRECLUDED FROM CONDUCTING THE RI/FS, THE TOWNSHIP MADE REPEATED REQUESTS TO PARTICIPATE WITH THE EPA AND DEP IN CONDUCTING THE RI/FS AND IN REVIEWING EARLY DRAFTS OF THE RI/FS AND THE FOCUSED FEASIBILITY STUDY (FSS), WHICH PROPOSES THE INSTALLATION OF CERTAIN IMMEDIATE REMEDIAL MEASURES (IRMS). UNFORTUNATELY, HOWEVER, THESE REQUESTS WERE DENIED. ACCORDINGLY, THE TOWNSHIP DID NOT HAVE ANY OPPORTUNITY TO REVIEW THE VOLUMINOUS DRAFT RI/FS BEFORE IT WAS RECEIVED BY MAYOR MULLEN ON AUGUST 12, 1985. ON SEVERAL OCCASIONS BEFORE AND DURING THE PUBLIC MEETING ON AUGUST 19, 1985, WE REQUESTED AN EXTENSION OF THE PUBLIC COMMENT PERIOD, WHICH WAS ORIGINALLY SCHEDULED TO CLOSE ON AUGUST 23, 1985.

WE ARE GRATEFUL TO ACKNOWLEDGE THAT, AT THE PUBLIC MEETING, JOHN FRISCO EXTENDED THE PUBLIC COMMENT PERIOD UNTIL AUGUST 31, 1985. HOWEVER, SUBSEQUENT TO THE PUBLIC MEETING, WE REQUESTED AN ADDITIONAL EXTENSION UNTIL SEPTEMBER 23, 1985 AND THIS REQUEST WAS DENIED. ON AUGUST 27, 1985, EPA ASSISTANT REGIONAL COUNSEL JAMES ROONEY ADVISED THAT EPA WOULD NOT GRANT ANY FORMAL EXTENSIONS BEYOND AUGUST 31, 1985 BUT THAT EPA WOULD NOT PROBABLY CONSIDER THE TOWNSHIP'S COMMENTS IF THEY WERE A FEW DAYS LATE.

WE RESPECTFULLY SUBMIT THAT EPA SHOULD CONDUCT FURTHER ANALYSIS AND SHOULD ALSO PROVIDE SOME ADDITIONAL OPPORTUNITY FOR FURTHER INVESTIGATION, REVIEW AND ANALYSIS BY INTERESTED PARTIES. HOWEVER, IN KEEPING WITH EPA'S ANNOUNCED SCHEDULE, WE ARE SUBMITTING COMMENTS ON SEPTEMBER 3, 1985, WHICH IS THE FIRST BUSINESS DAY FOLLOWING AUGUST 31, 1985, WHICH FELL ON THE SATURDAY OF LABOR DAY WEEKEND.

THE COMMENTS CONSIST OF A REPORT BY FRED C. HART AND ASSOCIATES, INC. (HART). IN ESSENCE, THE COMMENTS INDICATE THAT EPA HAS NOT CONDUCTED SUFFICIENT INVESTIGATION AND ANALYSIS TO DETERMINE WHETHER IT WOULD BE APPROPRIATE OR COST-EFFECTIVE TO INSTALL A SOIL CAP WITH PARTIAL LANDFILL EXCAVATION (ALTERNATIVE 3) OR A MULTIMEDIA CAP WITH PARTIAL LANDFILL EXCAVATION (ALTERNATIVE 4). IT IS THE OPINION OF HART THAT IT IS NOT NECESSARY, APPROPRIATE OR COST-EFFECTIVE TO INSTALL THE IRM NOW AND THAT MODELING ANALYSIS SHOULD BE

PERFORMED TO DETERMINE WHETHER ANY LEACHATE COLLECTION OR GROUNDWATER PUMPING AND TREATMENT WILL BE NECESSARY AFTER THE APPROPRIATE CAP AND LANDFILL GAS COLLECTION SYSTEM ARE INSTALLED. ACCORDINGLY, WE BELIEVE THAT EPA AND DEP SHOULD POSTPONE THEIR PLANS TO INSTALL THE IRM NOW.

YOU WILL NOTE THAT HART CONCLUDES THAT THE CONFIGURATION OF EPA'S PROPOSED GAS COLLECTION SYSTEM IS DEFECTIVE AND THAT THE GAS COLLECTION PIPES SHOULD BE REALIGNED FROM A HORIZONTAL TO A VERTICAL CONFIGURATION TO PREVENT OR MINIMIZE THE RISK OF GAS PIPELINE RUPTURES. WE ALSO BELIEVE THAT THE GAS COLLECTION SYSTEM SHOULD BE UPGRADED TO PROMOTE MORE THOROUGH COLLECTION OF THE LANDFILL GAS AND POSSIBLE USE OF SUCH GAS IN AN ENERGY CONSERVATION PROJECT THAT WOULD GENERATE SUBSTANTIAL REVENUES THAT COULD BE OFFSET AGAINST THE COST OF OTHER REMEDIAL ACTIONS TAKEN AT THE LANDFILL.

HART WILL BE CONDUCTING FURTHER STUDIES THIS FALL AND THE RESULTS OF THESE STUDIES AND ANALYSIS SHOULD BE AVAILABLE IN TWO (2) TO THREE (3) MONTHS. THE RESULTS OF THIS WORK WOULD PROVIDE INFORMATION THAT IS ESSENTIAL TO ANY DETERMINATION BY EPA OR DEP THAT THE IRM OR ANY SPECIFIC REMEDY PROPOSED IN THE RI/FS IS NECESSARY, APPROPRIATE OR COST-EFFECTIVE.

FINALLY, HART ADVISED THAT THE PROJECTED COSTS OF BOTH THE SOIL CAP (ALTERNATIVE 3) AND THE MULTIMEDIA CAP (ALTERNATIVE 4) ARE SUBSTANTIALLY OVERSTATED, THAT EITHER OF THE AFOREMENTIONED TYPES OF LANDFILL CAPS COULD BE INSTALLED WITHIN ONE (1) YEAR, AND THAT IT IS NOT NECESSARY TO EXTEND SUCH A PROJECT OVER A THREE (3) YEAR PERIOD AS INDICATED BY THE RI/FS. WE THINK IT IS IN THE BEST INTERESTS OF THE TOWNSHIP TO CONDUCT THE ADDITIONAL ANALYSIS ON AN EXPEDITED BASIS. WE ALSO THINK THAT THE APPROPRIATE CAP COULD BE INSTALLED NEXT YEAR. WE BELIEVE THE CAP WILL ELIMINATE THE SOURCE OF CONTAMINATION OF HOLLY RUN BECAUSE IT WILL ELIMINATE OR GREATLY REDUCE THE AMOUNT OF LEACHATE GENERATED BY THE LANDFILL AND WILL ELIMINATE OR GREATLY REDUCE THE SCOPE AND COST OF ANY LEACHATE AND GROUNDWATER TREATMENT PROGRAM REQUIRED AT THE LANDFILL. IF EPA AND DEP INSTALLED THE APPROPRIATE CAP NEXT YEAR, THERE WOULD BE AMPLE OPPORTUNITY TO MONITOR THE IMPACT OF THE CAP (RI/FS ALTERNATIVE 2) AND CONCLUDE WHETHER ANY LEACHATE OR GROUNDWATER COLLECTION AND TREATMENT IS REQUIRED LONG BEFORE THE COMPLETION OF THE THREE (3) YEAR SCHEDULE SPECIFIED IN THE RI/FS.

IN SPITE OF THE EXTREMELY SHORT COMMENT PERIOD ON THE 700 PLUS PAGE, 3 VOLUME RI/FS THAT WAS CONDUCTED BY EPA OVER A 2-YEAR PERIOD AT A COST OF OVER $1 MILLION, THE TOWNSHIP HAS MADE A GOOD FAITH EFFORT TO PROVIDE EXTENSIVE, CONSTRUCTIVE COMMENTS FOR EPA'S CONSIDERATION. THE TOWNSHIP RESERVES ITS RIGHT TO SUPPLEMENT THESE COMMENTS IN THE FUTURE AND TO EXPAND UPON THESE COMMENTS AND RAISE OTHER CRITICISMS AND DEFENSES IN ANY COST-RECOVERY ACTION OR OTHER LITIGATION THAT MAY BE BROUGHT BY OR AGAINST THE TOWNSHIP IN THE FUTURE.

VERY TRULY YOURS,

BENJAMIN G. STONELAKE, JR

BGS:CMB
CC: JAMES ROONEY, ESQUIRE
MARTY JUDGE, ESQUIRE
JORGE BERKOWITZ.

EVALUATION OF
FOCUSED FEASIBILITY STUDY
REMEDIAL INVESTIGATION
FEASIBILITY STUDY

FOR THE

GEMS LANDFILL
GLOUCESTER TOWNSHIP
CAMDEN COUNTY, N.J.

PREPARED BY:

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530 FIFTH AVENUE
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AUGUST 30, 1985

A REVIEW OF THE FOCUSED FEASIBILITY STUDY FOR THE GEMS LANDFILL SITE IN GLOUCESTER TOWNSHIP, CAMDEN COUNTY, NEW JERSEY (NUS CORPORATION, APRIL 1985) IDENTIFIED A NUMBER OF ISSUES WHICH SHOW THAT IT IS INAPPROPRIATE TO IMPLEMENT THE IMMEDIATE REMEDIAL MEASURES (IRM). THE ISSUES, DISCUSSED BELOW, ARE SUMMARIZED AS FOLLOWS:

1. THE GEMS LANDFILL RI/FS (NUS CORPORATION, AUGUST 1985) HAS CONCLUDED THAT THERE ARE NO IMMEDIATE HUMAN HEALTH EFFECTS FROM THE LANDFILL.

2. INSTITUTIONAL CONSTRAINTS -- PERMITS -- ARE EXTENSIVE AND MAY WELL DELAY THE IMPLEMENTATION OF THE IRM. THERE WOULD THEN BE NO "IMMEDIATE" BENEFIT.

3. THE IRM GROUNDWATER TREATMENT SYSTEM MAY HAVE TO BE REMOVED OR ABANDONED IF IT HAS NOT BEEN INTEGRATED INTO THE DESIGN OF A LONG-RANGE TREATMENT SOLUTION.

4. UNDER CURRENT NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION (NJDEP) AIR POLLUTION REQUIREMENTS, THERE IS NO NEED FOR THE PROPOSED CARBON ADSORPTION SYSTEM TO REMOVE PROJECTED QUANTITIES OF VOLATILE ORGANIC COMPOUNDS (VOCS) AIR-STRIPPED FROM THE GROUNDWATER TREATED AT THE SITE.

5. THE PROPOSED IRM WILL NOT ELIMINATE ODORS FROM THE LANDFILL, ONEOF THE MAIN REASONS GIVEN FOR IMPLEMENTATION.

6. THERE IS INSTITUTIONAL RESISTANCE AS WELL AS POSSIBLE PROCESS PROBLEMS ASSOCIATED WITH THE USE OF THE GLOUCESTER TOWNSHIP MUNICIPAL UTILITIES AUTHORITY (GTMUA) WASTEWATER TREATMENT PLANT TO PROVIDE BIOLOGICAL TREATMENT OF GROUNDWATER EXTRACTED FROM THE GEMS LANDFILL.

THESE ISSUES ARE DISCUSSED IN MORE DETAIL BELOW.

IMMEDIATE RISK TO PUBLIC HEALTH

THE REMEDIAL INVESTIGATION (RI) COMPLETED BY NUS CORPORATION IN AUGUST, 1985 DID NOT IDENTIFY SIGNIFICANT HUMAN EXPOSURE TO LANDFILL CONTAMINANTS AT THE PRESENT TIME:

- CONTAMINANT LEVELS IN AIR WERE SIMILAR TO LEVELS FOUND IN OTHER LOCATIONS THROUGHOUT THE STATE.
- THE QUALITY OF WATER FROM RESIDENTIAL WELLS ADJACENT TO THE LANDFILL WAS TESTED AND THE RESULTS WERE WITHIN ACCEPTABLE DRINKING WATER QUALITY STANDARDS.
- THERE IS NO DIRECT PATHWAY BETWEEN CONTAMINATED SEDIMENTS IN HOLLY RUN AND THE LOCAL POPULATION.

- THE NJDEP REPORTED THAT METHANE DETECTORS PLACED IN NEARBY HOMES BY THE NJDEP DID NOT DETECT METHANE IN ANY OF THE HOMES.

TOGETHER, THESE FACTORS SIGNIFY THAT AN IMMINENT RISK TO THE PUBLIC HEALTH DOES NOT EXIST. HENCE, HART QUESTIONS THE NEED TO IMPLEMENT THE SHORT-TERM IRM.

INSTITUTIONAL CONSTRAINTS

THE FOCUSED FEASIBILITY STUDY IDENTIFIED EIGHT SEPARATE PERMITS THAT MUST BE APPROVED BEFORE THE IRM CAN BE IMPLEMENTED. THEY ARE:

1. STATE OF NEW JERSEY PERMITS FOR THE INSTALLATION OF MONITORING WELLS.

2. STATE OF NEW JERSEY PERMITS TO PERFORM PUMPING TESTS.

3. NJDEP AIR POLLUTION CONTROL PERMITS.

4. ADJUSTMENTS TO THE GTMUA WASTEWATER TREATMENT PLAN DISCHARGE PERMIT (NJPDES).

5. STREAM RELOCATION AND ENCROACHMENT PERMITS FROM THE NJDEP.

6. STREAM RELOCATION AND ENCROACHMENT PERMITS FROM CORPS OF ENGINEERS (COE).

7. CAMDEN COUNTY EROSION AND SEDIMENT CONTROL PERMITS.

8. PROPERTY EASEMENTS FROM FOX CHASE II LAND OWNERS.

THESE INSTITUTIONAL CONSTRAINTS MUST BE RESOLVED BEFORE THE PROPOSED IRM CAN BE IMPLEMENTED. MOST OF THESE ITEMS WILL HAVE TO BE ADDRESSED AGAIN WHEN THE FEASIBILITY STUDY IS IMPLEMENTED. HART ANTICIPATES THAT INSTITUTIONAL CONSTRAINTS WILL SIGNIFICANTLY DELAY IMPLEMENTATION OF THE IRM, THUS NEGATING THE "IMMEDIATE BENEFIT" ASPECT OF THE IRM.

REDUNDANCY OF THE IRM GROUNDWATER TREATMENT

THE GROUNDWATER TREATMENT SYSTEM PROPOSED FOR THE IRM IS A TWO COLUMN AIR-STRIPPING SYSTEM DESIGNED TO OPERATE AT A FLOW RATE OF 60 GPM. THE FLOW RATE OF THE TREATMENT SYSTEM PROPOSED IN THE FS IS 180 GPM; THE SYSTEM ALSO CONTAINS TWO AIR-STRIPPING COLUMNS. THE IRM SYSTEM MUST EITHER BE OVER-DESIGNED TO BE ABLE TO HANDLE THE LONG-RANGE FLOW OR ABANDONED WHEN IT IS REPLACED BY THE FS ALTERNATIVE. HART FINDS THAT THE IRM AND LONG-RANGE GROUNDWATER TREATMENT SYSTEMS ARE REDUNDANT AND RECOMMENDS THAT, IF THE IRM SYSTEM IS INSTALLED, IT SHOULD BE: (1) REDESIGNED TO REFLECT LONG-RANGE GOALS OR (2) BE POSTPONED UNTIL LONG-RANGE SOLUTIONS ARE FINALIZED.

AIR POLLUTION REQUIREMENTS

BASED ON MONITORING DATA INCLUDED IN THE FFS, THE TOWNSHIP STATED IN ITS MAY 29, 1985 COMMENTS ON THE FFS (WHICH ARE INCLUDED AS ATTACHMENT A) THAT IT WOULD NOT BE NECESSARY TO INSTALL AN AIR POLLUTION CONTROL SYSTEM ON THE AIR-STRIPPING COLUMN. HART HAS CALCULATED THAT THE EMISSION OF TOXIC VOLATILE ORGANICS FROM THE IRM AIR-STRIPPING COLUMNS WILL BE WITHIN THE LIMITS SET BY NJDEP (3.5 LBS PER HOUR OF TOTAL TOXIC VOLATILE ORGANICS; 0.1 LBS PER HOUR FOR INDIVIDUAL VOLATILE ORGANICS). IT APPEARS FROM HART'S ANALYSIS THAT THE PROPOSED CARBON ADSORPTION AND GAS FLARE SYSTEM WOULD NOT BE NEEDED.

THE CONCENTRATION OF METHYLENE CHLORIDE LISTED IN TABLE 1 OF THE FOCUSED FEASIBILITY STUDY INDICATES THAT THIS PARAMETER WOULD EXCEED THE NJDEP LIMIT OF 0.1 LBS OF TOXIC VOLATILE ORGANICS. METHYLENE CHLORIDE, THOUGH, IS A COMMON LABORATORY CONTAMINANT AND, AS THE REMEDIAL INVESTIGATION INDICATES, CONCENTRATIONS BASED ON SINGLE VALUES FOR THIS PARAMETER WOULD BE SUSPECT. IT SHOULD ALSO BE NOTED THAT AIR EMISSIONS BASED ON THE HIGHEST VALUE OF METHYLENE CHLORIDE REPORTED IN THE REMEDIAL INVESTIGATION (FROM THE NUS AND TAT

SAMPLING) WOULD BE WELL WITHIN THE NJDEP 0.1 LB PER HOUR LIMIT.

ODORS

ODORS EMANATING FROM THE LANDFILL ARE ONE OF THE PRIMARY REASONS STATED FOR THE IMPLEMENTATION OF THE HOLLY RUN CLEAN-UP PORTION OF THE IRM. IT IS LIKELY THAT ODORS ARE EMANATING FROM THE HOLLY RUN AREA BUT IT IS ALSO LIKELY THAT GASES FROM LANDFILL WASTE DECOMPOSITION ARE LEAVING THE LANDFILL THROUGH THE UNCAPPED TOP SURFACE OF THE LANDFILL. THE HOLLY RUN IRM, THEN, WOULD NOT ATTAIN ITS PRIMARY GOAL; THAT IS, IT WOULD NOT IMMEDIATELY STOP ODORS FROM REACHING NEARBY RESIDENCES. HART CONCLUDES, THEN, THAT THE HOLLY RUN IRM WOULD ONLY SERVE TO REDUCE ONE OF A NUMBER OF POTENTIAL ODOR SOURCES.

FINAL TREATMENT FOR AIR-STRIPPER EFFLUENT

THE FOCUSED FEASIBILITY STUDY PROPOSES TO DISCHARGE EFFLUENT FROM THE AIR STRIPPER COLUMNS (GROUNDWATER TREATMENT SYSTEMS) TO THE GTMUA WASTEWATER TREATMENT PLANT FOR TREATMENT OF NON-VOLATILE PRIORITY POLLUTANTS (MOSTLY HEAVY METALS) AND CONVENTIONAL CONTAMINANTS (BOD, SS, ETC.). PROBLEMS IDENTIFIED WITH THIS PROPOSAL ARE AS FOLLOW:

1. INTERFERENCE. THE TOXICITY OF PRIORITY POLLUTANTS MAY LEAD TO AN INHIBITION OF THE BIOLOGICAL PROCESSES NECESSARY TO OPERATE A WASTEWATER TREATMENT PROCESS (ACTIVATED SLUDGE AND BIOLOGICAL DIGESTION). IN EXTREME CASES, PRIORITY POLLUTANTS CAN STOP ALL BIOLOGICAL TREATMENT PROCESSES AT A MUNICIPAL WASTEWATER TREATMENT PROCESS. THE TREATABILITY STUDY CONDUCTED BY PRINCETON AQUA SCIENCE (PAS) FOR NUS CORPORATION CONCLUDED THAT PRIORITY POLLUTANT LOADINGS FROM THE GROUNDWATER TREATMENT AIR-STRIPPER WERE TOO HIGH AND SHOULD BE REDUCED BEFORE DISCHARGE TO GTMUA. THE SUGGESTION IN APPENDIX A OF THE FS TO DISCHARGE AIR STRIPPER EFFLUENT TO GTMUA DURING LOW FLOW PERIODS WOULD INCREASE THE LIKELIHOOD OF TREATMENT PLANT INTERFERENCES.

2. PASS THROUGH. HEAVY METALS PASS THROUGH CONVENTIONAL WASTEWATER TREATMENT PLANTS, LEAVING THE PLANTS WITH THE TREATED EFFLUENT OR WITH SETTLED SLUDGE. HEAVY METALS IN SLUDGE MAY LIMIT THE GTMUA'S SLUDGE DISPOSAL OPTIONS.

3. INSTITUTIONAL CONSTRAINTS. FEDERAL, STATE AND LOCAL PRETREATMENT PROGRAMS WILL PROBABLY REQUIRE REMOVAL OF PRIORITY POLLUTANTS -- ESPECIALLY HEAVY METALS -- BEFORE DISCHARGE OF AIR STRIPPER EFFLUENT TO THE GTMUA. PRETREATMENT PROCESSES -- IF REQUIRED -- SHOULD BE INTEGRATED WITH THE LONG-RANGE (FS) ALTERNATIVE.

EVALUATION OF REMEDIAL INVESTIGATION

A REVIEW OF THE REMEDIAL INVESTIGATION REPORT FOR THE GEMS LANDFILL SITE (NUS CORPORATION, JULY 1985) IDENTIFIED A CONTAMINANT PLUME EXTENDING BEYOND THE BOUNDARIES OF THE LANDFILL IN ALL DIRECTIONS. THIS PLUME OF CONTAMINATION HAS BEEN MODELED AND THE REMEDIAL ACTION OF GROUNDWATER PUMPING AND TREATMENT WAS RECOMMENDED BY THE USEPA. THE REMEDIAL INVESTIGATION DID NOT DISCUSS THE GROUNDWATER MODELING IN DETAIL, AS TO WHETHER OTHER ALTERNATIVE REMEDIATIONS BESIDES GROUNDWATER PUMPING ARE FEASIBLE. THE USEPA TAT GROUNDWATER STUDY IS MENTIONED IN THE NUS REPORT AND THE HYDROGEOCHEMICAL DATA AND BORING DATA ARE UTILIZED. NONE OF THE TAT BORING LOGS AND WELL CONSTRUCTION DIAGRAMS ARE PRESENTED IN THE APPENDICES WITH THE NUS INFORMATION, THUS NOT PRESENTING A COMPLETE RECORD FOR REVIEW.

PLUME OF CONTAMINATION

CONTAMINATION OF THE COHANSEY-KIRKWOOD AQUIFER WAS STUDIED IN TWO PHASES, THE EPA TAT GROUNDWATER STUDY AND THE NUS STUDY. THE TAT STUDY HAS DOCUMENTED CONTAMINATION IN SEVERAL WELLS. UNFORTUNATELY, THE BORING LOGS AND WELL CONSTRUCTION DIAGRAMS ARE NOT INCLUDED IN THE APPENDICES FOR ANY OF THESE WELLS. WITHOUT THIS INFORMATION HART WAS NOT ABLE TO ASSESS THE QUALITY OF THE DATA IN TERMS OF PROPER WELL CONSTRUCTION. WE SUGGEST THAT THIS INFORMATION BE COLLECTED AND THAT HART REVIEW THE DATA AS PART OF A FUTURE WORK EFFORT.

THE CHAPTER ON GROUNDWATER CONTAMINATION IN THE NUS STUDY INDICATES THAT CONTAMINATION WAS FOUND IN SEVERAL WELLS. IN REVIEWING THE RESULTS IT APPEARS THAT MANY OF THE RESULTS PRESENTED ARE BELOW ESTABLISHED GROUNDWATER STANDARDS I.E. USEPA INTERIM PRIMARY DRINKING WATER STANDARDS (IPDWS) AND USEPA AMBIENT WATER QUALITY CRITERIA (AWQC). BARIUM LEVELS IN THE TAT STUDY WERE NOTED AS "HIGH" AT 842, 799, 923, AND 3173

UG/L. ONLY THE VALUE IN WELL 107A OF 3173 UG/L IS OVER THE LIMIT OF 1000 UG/L SET BY IPDWS. PHENOLS DETECTED IN TWO WELLS AT CONCENTRATIONS OF 268 AND 45 UG/L WERE WELL BELOW THE AWQC LIMIT OF 3500 UG/L. ALSO NOTED WAS THE PRESENCE OF LEAD IN 14 WELLS RANGING FROM 11 TO 73 UG/L, ONLY TWO OF THE 14 VALUES WERE ABOVE THE IPDWS FOR THE TAT STUDY.

THE GROUNDWATER STUDIES PERFORMED BY NUS IN TWO PHASES INDICATED "CONTAMINATED GROUNDWATER" THAT WAS BELOW ESTABLISHED FEDERAL STANDARDS IN THE SECOND PHASE. THIS SECOND PHASE OF THE NUS GROUNDWATER STUDY INDICATED ELEVATED VALUES OF PHENOLS AND NAPHTHALENE, HOWEVER THESE STILL WERE LESS THAN THE LIMITS SET BY AWQC.

IN CONCLUSION IT IS IMPORTANT TO LOOK AT THE LEVEL OF CONTAMINATION IN RELATION TO WATER QUALITY STANDARDS WHICH ARE AVAILABLE. WE SUGGEST THAT, AS PART OF A FUTURE WORK EFFORT, HART PERFORM A MORE IN-DEPTH REVIEW OF REPORTED CONCENTRATIONS, STANDARDS AND CRITERIA. WE ALSO SUGGEST THAT THE FUTURE HART WORK INCLUDE A QUALITY CONTROL CHECK ON THE CHEMICAL VALUES WITH SPLIT SAMPLE ANALYSES.

WELL INSTALLATION AND SAMPLING PROCEDURES

BORING LOGS FOR THE SITE HAVE ONLY BEEN PRESENTED FOR THE NUS WELLS, WHILE CROSS SECTIONS INCLUDE THE USEPA TAT DATA. WELL CONSTRUCTION DIAGRAMS CAN BE FOUND FOR ONLY THE NUS WELLS. HYDROGEOCHEMICAL DATA WAS UTILIZED FROM THE USEPA TAT WELLS SO IT IS NECESSARY TO INCLUDE ALL THE WELL CONSTRUCTION DIAGRAMS FOR THEIR REVIEW TO ASSURE THE INTEGRITY OF THE DATA. WELL CONSTRUCTION DIAGRAMS FOR THE NUS WELLS APPEAR TO HAVE ADEQUATELY TAKEN INTO ACCOUNT THE NEED FOR OUTSIDE CASING WHEN CASING TO THE DEEPER AQUIFER. THE NUS GROUNDWATER MONITORING WELLS APPEAR TO BE OF SOUND CONSTRUCTION. NO MENTION IS MADE OF THE DECONTAMINATION PROCEDURES FOLLOWED FOR DRILLING, WELL INSTALLATION AND SAMPLING.

HYDROGEOLOGY

HART JUDGES THAT ADDITIONAL GROUNDWATER MODELING IS NECESSARY TO ASSESS THE IMPACT OF REMEDIAL MEASURES OTHER THAN THOSE DESCRIBED BY NUS. IT WOULD BE HELPFUL TO TAKE INTO ACCOUNT THE SURFACE WATER FLOW WHEN MODELING THE HYDROLOGIC REGIME AS IT AFFECTS THE REMEDIATION REQUIRED. THE ONLY GROUNDWATER ALTERNATIVE WHICH WAS ANALYZED WAS DEWATERING. OTHER ALTERNATIVES -- WHICH WILL BE DISCUSSED IN A FOLLOWING SECTION ON GROUNDWATER PUMPING -- SHOULD BE EVALUATED WITH THE MODEL. WE SUGGEST THAT HART COLLECT AND REVIEW BORING LOGS AND WELL CONSTRUCTION DIAGRAMS. THE CROSS SECTIONS AVAILABLE APPEAR TO BE ADEQUATELY INTERPRETED.

GEOPHYSICAL SURVEY

THE SURFACE RESISTIVITY SURVEY APPEARS TO HAVE ADEQUATELY COVERED THE PERIMETER OF THE LANDFILL. THE 1981 REPORT BY NJDEP STATES THAT SURFACE AND GROUNDWATER CONTAMINATION IS FLOWING NORTHEAST, SOUTH, AND WEST FROM THE GEMS SITE, BASED ON CONDUCTIVITY/RESISTIVITY SURVEYS AND SAMPLING DATA. THE NUS STUDY FOUND THEIR RESULTS DID NOT TOTALLY COINCIDE WITH THE NJDEP FINDINGS (I.E., THAT CONTAMINATION FLOWS SOUTH AND WEST FROM THE SITE). THIS DISCREPANCY SHOULD BE ANALYZED CLOSELY, ALONG WITH THE FACT THAT SEVERAL OF THE CHEMICAL CONSTITUENTS CONSIDERED TO HAVE ELEVATED VALUES IN THE GROUNDWATER WERE STILL BELOW ESTABLISHED FEDERAL STANDARDS.

AIR, SURFACE WATER, SOIL AND SEDIMENT SAMPLING

SAMPLING OF THE SURFACE WATER, SOIL, SEDIMENT, AND AIR WAS PERFORMED BY NUS IN ADDITION TO THE GROUNDWATER STUDY. THE CONCLUSIONS REACHED BY THESE STUDIES APPEAR TO BE ADEQUATELY INTERPRETED.

SUMMARY OF REMEDIAL INVESTIGATION

THE REMEDIAL INVESTIGATION PERFORMED BY NUS EXPLORED MANY ASPECTS OF POTENTIAL CONTAMINATION AT THE GEMS LANDFILL SITE. CONTAMINATION IN THE GROUNDWATER FROM THE COHANSEY-KIRKWOOD AQUIFER HAS BEEN DOCUMENTED IN SEVERAL WELLS. THE FINDINGS OF THE HART REPORT INDICATES THAT NOT ALL OF THE CONTAMINANTS THAT WERE MENTIONED AS "HIGH" OR INFERRED TO AS HIGH, IN THE NUS RI WERE OVER ESTABLISHED FEDERAL STANDARDS, I.E. USEPA INTERIM PRIMARY DRINKING WATER STANDARDS AND THE USEPA AMBIENT WATER QUALITY CRITERIA. A LOT OF THE CONCLUSIONS PRESENTED IN THE RI WERE BASED ON DATA FROM THE USEPA TAT GROUNDWATER STUDY. THIS BACKGROUND DATA FROM THE TAT STUDY WAS NOT INCLUDED IN APPENDICES OF THE RI (I.E. WELL CONSTRUCTION DIAGRAMS AND BORING

LOGS). IT WAS THEREFORE IMPOSSIBLE FOR HART TO ASSESS THE DATA QUALITY, NOT KNOWING IF PROPER DECONTAMINATION PROCEDURES WERE PERFORMED AND IF THE WELLS ARE OF SOUND CONSTRUCTION. A REVIEW OF THIS MISSING INFORMATION IN THE FUTURE IS RECOMMENDED. THE DISCREPANCY BETWEEN THE GEOPHYSICAL SURVEYS PERFORMED FOR THE NUS RI AND THE NJDEP 1981 STUDY SHOULD BE ANALYZED IN DETAIL WITH HYDROGEOCHEMICAL BACKUP DATA. THE CONCLUSIONS REACHED BY NUS ON THE AIR, SURFACE WATER, SOIL AND SEDIMENT STUDIES APPEAR TO BE ADEQUATELY INTERPRETED.

EVALUATION OF GEMS FEASIBILITY STUDY

THE FEASIBILITY STUDY (NUS CORPORATION, AUGUST 1985) EVALUATED ALTERNATIVE MEASURES FOR THE GEMS LANDFILL. THE USEPA ANNOUNCED AT THE PUBLIC MEETING HELD ON AUGUST 19, 1985 THAT ALTERNATIVE 8 OF THE FEASIBILITY STUDY -- WITH MODIFICATION -- WILL BE IMPLEMENTED AT THE GEMS LANDFILL. THIS ALTERNATIVE HAS BEEN REVIEWED BY HART AND COMMENTS REGARDING IMPLEMENTATION AND COSTS ARE PROVIDED LATER IN THIS SECTION. THE KEY COMPONENTS OF THE SELECTED ALTERNATIVE ARE DESCRIBED AS FOLLOWS:

1. PARTIAL EXCAVATION

THE TOP EDGE OF THE LANDFILL AND THE BOTTOM OF THE SOUTHERN SLOPE WILL BE EXCAVATED TO PRODUCE A 3:1 SLOPE FOR CAP INSTALLATION; EXCAVATED MATERIAL WILL BE PLACED ON TOP OF THE LANDFILL;

2. MULTIMEDIA CAP - TOP OF LAND FILL ONLY

3% SLOPE
SIX FEET OF MATERIAL (TOP TO BOTTOM):

2' - SOIL AND TOPSOIL FILTER FABRIC
1' - SAND
30 MIL SYNTHETIC MEMBRANE
2' - CLAY FILTER
1' - GRAVEL AND VENTS (SEE GAS COLLECTION #4) FILTER

3. SIDE SLOPE CAP

6" - TOP SOIL
30" - CLAY

4. GAS COLLECTION AND TREATMENT

12" GRAVEL LAYER WITH VENT PIPES
4" DIAMETER PERFORATED PVC PIPE, 200' APART (GRID)
PUMP STATION WITH 4 BLOWERS (300 CFM EACH)
GAS PRODUCTION: UP TO 50,000 CFM OVER LIFE OF LANDFILL
GAS TREATMENT: CARBON ADSORPTION AND GAS FLARE

5. FOUNDATION AND TOE DRAIN

8" DIAMETER PERFORATED PVC PIPE
GRAVEL DRAIN

6. SURFACE WATER DIVERSION CHANNELS

BERMS (4' AT TOP, 11' AT BOTTOM)
LANDFILL RUNOFF CHANNELS

7. SOIL EROSION CONTROL

SILT FENCE

SEDIMENTATION BASINS

8. SECURITY FENCE

9. REMEDIATION OF HOLLY RUN

EXCAVATE CONTAMINANTS AND RETURN TO LANDFILL
RECONSTRUCT AND RE-LINE CHANNEL
DESIGN NEW CHANNEL FOR 250 CFS (10 YR, 24 HR)

10. GROUNDWATER PUMPING

24 WELLS
AVERAGE DRAWDOWN OF 25 FEET
TOTAL PUMPING RATE = 180 GPM = 259,200 GPD
FOR UNCAPPED LANDFILL: MAXIMUM OF 83 PERCENT CONTAMINANT REMOVAL AFTER 15 YEARS
FOR CAPPED LANDFILL: MAXIMUM OF 99 PERCENT CONTAMINANT REMOVAL AFTER 20 YEARS

11. GROUNDWATER TREATMENT

FLOW = 259,200 GPD
PROCESSES INCLUDE:

- PRIMARY SETTLING
- LIME ADDITION
- FERRIC CHLORIDE ADDITION
- FLOCCULATION
- CLARIFICATION
- AIR STRIPPING
- CARBON ADSORPTION (AIR)
- EITHER:
  - (A) ACTIVATED SLUDGE SAND FILTERS AND CARBON ABSORPTION (EFFLUENT)
  - (B) DISCHARGE TO MUNICIPAL WASTEWATER TREATMENT.

EACH OF THESE COMPONENTS WERE EVALUATED TO DETERMINE WHETHER, IN HART'S JUDGEMENT, THERE ARE TECHNICAL PROBLEMS WITH IMPLEMENTATION AND WHETHER THE COSTS PRESENTED IN THE FEASIBILITY STUDY ARE CONSISTENT WITH HART'S EXPERIENCE ON SIMILAR PROJECTS. THE RESULTS ARE DISCUSSED SEPARATELY FOR ALTERNATIVE COMPONENTS WHICH HART BELIEVES HAVE TECHNICAL PROBLEMS AND FOR COMPONENT COSTS WHICH WE JUDGE TO BE INACCURATE.

EVALUATION RESULTS: TECHNICAL PROBLEMS

THERE ARE FIVE COMPONENTS WHICH WE BELIEVE HAVE TECHNICAL PROBLEMS:

MULTIMEDIA CAP
GAS COLLECTION AND TREATMENT SYSTEM
SIDE SLOPE CAP
FOUNDATION AND TOE DRAIN
GROUNDWATER PUMPING.

PROBLEMS ARE DISCUSSED AS FOLLOWS.

MULTIMEDIA CAP. THE FEASIBILITY STUDY DEFINES TWO TYPES OF CAPS: A SOILS CAP (ALTERNATIVE 3) AND A MULTIMEDIA CAP (ALTERNATIVE 4). THE ALTERNATIVE TENTATIVELY CHOSEN BY EPA (PUBLIC MEETING, GLOUCESTER TOWNSHIP, AUGUST 19, 1985) RECOMMENDS INSTALLING THE MULTIMEDIA CAP DESCRIBED IN THE FEASIBILITY STUDY FOR ALTERNATIVE 4. IT INCLUDES TWO FEET OF SOIL, ONE FOOT OF SAND, TWO FEET OF CLAY, SYNTHETIC MEMBRANE AND FILTER FABRIC (SEE DESCRIPTION OF SELECTED ALTERNATIVE, ABOVE). THE CAPITAL COST FOR THE ALTERNATIVE 4 MULTIMEDIA CAP IS LISTED IN APPENDIX C OF THE FEASIBILITY STUDY AS $20,347,209. THE CAP NOT CHOSEN (THE SOIL CAP DESCRIBED IN ALTERNATIVE 3 OF THE FEASIBILITY STUDY) INCLUDES A THREE-FOOT LAYER OF TOP SOIL AND SOIL.

THE FEASIBILITY STUDY ESTIMATED THE COST FOR THE ALTERNATIVE 3 SOILS CAP TO BE $8,921,285. THE ADDITIONAL $11,425,924 COST OF THE ALTERNATIVE 4 MULTIMEDIA CAP ON THE ALTERNATIVE 3 SOILS CAP IS CHIEFLY DUE TO FOUR FACTORS:

1. THE ADDITION OF FILTER FABRIC AND SYNTHETIC MEMBRANE. (THIS IS RESPONSIBLE FOR ABOUT 50% OF THE ADDITIONAL COST.).

2. THE ADDITIONAL SOIL. (RESPONSIBLE FOR ABOUT 30% OF THE ADDITIONAL COST.).

3. THE LAYER OF CLAY USED IN THE MULTIMEDIA CAP WHICH IS NOT USED IN THE SOILS CAP. (RESPONSIBLE FOR ABOUT 13% OF THE ADDITIONAL COST.).

4. THE ADDITIONAL GROUND. (RESPONSIBLE FOR ABOUT 8% OF THE ADDITIONAL COST.).

THE PARTICULAR BENEFITS WHICH EACH OF THESE ADDITIONAL COMPONENTS BRING TO THE SUCCESS OF THE PROJECT ARE NOT ADDRESSED IN THE FEASIBILITY STUDY. THAT IS, THE DESCRIPTION IN THE FEASIBILITY STUDY OF THE PERFORMANCE AND RELIABILITY OF THE ALTERNATIVE 3 AND ALTERNATIVE 4 CAPS IS THE SAME. IN GENERAL THE BENEFITS OF EACH TYPE OF CAP ARE RELATED TO THE DECREASE IN LEACHATE COLLECTION AND TO THE SUBSEQUENT DECREASE IN GROUNDWATER PUMPING AND TREATMENT. HART RECOMMENDS THAT THE GROUNDWATER MODELING (PROPOSED IN A FOLLOWING SECTION - SEE GROUNDWATER PUMPING) BE USED TO OPTIMIZE THE SELECTED COVER DESIGN. THAT IS, THE ABILITY OF EACH COMPONENT TO REDUCE LEACHATE GENERATION AND REDUCE OR ELIMINATE THE COSTS OF COLLECTING AND TREATING LEACHATE AND GROUNDWATER SHOULD BE DETERMINED AND COMPARED TO THE COST TO IMPLEMENT THAT COMPONENT.

SIDE SLOPE CAP. THE SIDE SLOPE CAP PROPOSED IN THE FEASIBILITY STUDY CONSISTS OF THREE FEET OF MATERIAL INCLUDING SIX INCHES OF TOPSOIL AND 30" OF LOW PERMEABILITY SOIL. THE USEPA CHANGED THE MATERIAL REQUIREMENTS FOR THE 30" LAYER FROM TOPSOIL TO CLAY. NO SYNTHETIC LINER WOULD BE USED BECAUSE OF THE STEEPNESS OF THE SLOPE. THE PROBLEM WITH THE SIDE SLOPE CAP LIES IN THE CONFIGURATION OF THE DRAINAGE COLLECTION TRENCHES. THESE TRENCHES ARE APPROXIMATELY TWELVE FEET WIDE BENCHES CUT INTO THE SIDE OF THE LANDFILL. DIFFERENTIAL SETTLING HAS LED TO PROBLEMS WITH BENCHES SUCH AS THESE AT OTHER SOLID WASTE LANDFILLS. SETTLING CREATES LARGE DEPRESSED AREAS, WHICH FILL WITH RUNOFF. THE RUNOFF CONTAINED IN THESE AREAS OVERFLOW OVER THE SIDES OF THE LANDFILL CREATING GULLIES AND ERODING OTHER BENCHES FURTHER DOWN THE SLOPE. OPERATING HAZARDOUS WASTE LANDFILLS HAVE BEGUN IMPLEMENTING A DIFFERENT SIDE SLOPE CAP DESIGN. THE NEW DESIGN -- CALLED MICROTERRACING -- USES SMALLER BUT MORE FREQUENT TRENCHES TO CHANNEL STORMWATER AND TO DISSIPATE SOME OF THE ENERGY OF THE STORMWATER RUNNING DOWN THE SLOPE. THE TECHNIQUE HAS BEEN USED SUCCESSFULLY AT A NUMBER OF SECURE HAZARDOUS WASTE LANDFILLS IN THE NORTHEAST. HART RECOMMENDS THAT MICROTERRACING OR ANOTHER SIDE SLOPE ALTERNATIVE BE INVESTIGATED FOR THE GEMS LANDFILL.

GAS COLLECTION AND TREATMENT SYSTEM. THE GAS COLLECTION AND TREATMENT SYSTEM PROPOSED IN THE FS (FIGURE 3-3 IN THE FS) CONSISTS OF HORIZONTAL 4" DIAMETER PERFORATED PVC PIPE PLACED IN A GRID APPROXIMATELY 200 FEET APART OVER THE TOP OF THE LANDFILL. THE PIPE WILL BE LOCATED WITHIN A 12" DEEP LAYER OF GRAVEL DIRECTLY OVERLAYING THE LANDFILL WASTE. THE GEMS LANDFILL IS ESSENTIALLY A SOLID WASTE LANDFILL AND, AS SUCH, CAN BE EXPECTED TO SETTLE AND COMPRESS AT DIFFERENT RATES. THE GRAVEL LAYER WILL ALSO SETTLE DIFFERENTIALLY AND, AS A RESULT, THE PIPES WILL BEND, COMPRESS AND SHEAR. VENTING WILL BE UNEVEN AND AREAS OF THE LANDFILL MAY NOT BE VENTED. HART RECOMMENDS THAT THE PROPOSED GRID SYSTEM OF HORIZONTAL PIPES BE REPLACED WITH VERTICAL GAS COLLECTION PIPES LOCATED OVER THE TOP OF THE LANDFILL. THE SYSTEM WOULD NOT BE SUSCEPTIBLE TO STRUCTURAL FAILURE FROM SETTLING AND CAN BE DESIGNED TO PROVIDE THE SAME COLLECTION CAPACITY AS THAT OF THE FEASIBILITY STUDY GAS COLLECTION SYSTEM.

THE FEASIBILITY STUDY PROPOSES A TREATMENT SYSTEM FOR THE GAS COLLECTED FROM THE LANDFILL. GAS FROM SOLID WASTE LANDFILLS CAN ALSO BE RECOVERED AND USED FOR ITS HEATING CONTENT OR FOR ON-SITE GENERATION OF ELECTRICITY. THIS IS BECOMING A COMMON PRACTICE AT AN INCREASING NUMBER OF LANDFILLS, REUSE OF THE GAS GENERATED FROM THE GEMS LANDFILL IS PREFERABLE TO TREATMENT FOR ECONOMIC AND ENVIRONMENTAL REASONS: GAS RECOVERY DOES NOT GENERATE A HAZARDOUS WASTE, AS DOES GAS TREATMENT (I.E., POLLUTANT SATURATED CARBON), AND GAS RECOVERY GENERATES AN INCOME-PRODUCING RESOURCE (GAS OR ELECTRICITY). HART RECOMMENDS THAT A GAS RECOVERY SYSTEM BE INVESTIGATED FOR THE GEMS LANDFILL AS A REPLACEMENT FOR THE FEASIBILITY STUDY GAS TREATMENT SYSTEM.

FOUNDATION AND TOE DRAIN. THE FEASIBILITY STUDY PROPOSES A SPECIFIC FOUNDATION AND TOE DRAIN DESIGN FOR THE BOTTOM OF THE SIDE SLOPE TO BE USED ONLY ON THE NORTHEAST AND WEST SLOPES OF THE GEMS LANDFILL. A CROSS SECTION OF THE DRAIN IS SHOWN IN FIGURE 3-2 OF THE FEASIBILITY STUDY. THE CROSS-SECTION SHOWS THAT GRAVEL COLLECTION TRENCH SEPARATED FROM THE WASTE BY A WEDGE OF ORIGINAL SOIL. THE FLOW OF LEACHATE FROM THE WASTE TO THE GRAVEL IS IMPAIRED BY THIS SOIL WEDGE. HART RECOMMENDS THAT THE DESIGN BE REVISED TO CREATE A MORE DIRECT PATHWAY FOR LEACHATE TO MOVE FROM THE WASTE TO THE GRAVEL DRAIN.

GROUNDWATER PUMPING. ON AUGUST 19, 1985 THE USEPA ANNOUNCED AT THE PUBLIC MEETING THAT ALTERNATIVE 8 OF THE FEASIBILITY STUDY -- WITH MODIFICATION -- WILL BE IMPLEMENTED AT THE GEMS LANDFILL. GROUNDWATER PUMPING AND TREATMENT IS INCLUDED IN THE PROPOSED REMEDIATION FOR THE GEMS SITE. THE GROUNDWATER SYSTEM HAS BEEN MODELED IN CONJUNCTION WITH THE NUS STUDY. IN ORDER TO EVALUATE THE EFFECTIVENESS OF GROUNDWATER PUMPING OVER OTHER REMEDIAL TECHNOLOGIES SEVERAL FACTORS SHOULD BE TAKEN INTO ACCOUNT:

1) THE EFFECT OF CAPPING THE LANDFILL WILL NOT ONLY REDUCE THE AMOUNT OF WATER INFILTRATING INTO THE LANDFILL BUT CAN ALSO AFFECT THE DIRECTION OF A CONTAMINANT PLUME. THE PLUME COULD POSSIBLY BE MORE LAMINAR IN FLOW IF THE LANDFILL IS CAPPED.

2) IN GROUNDWATER MODELING THERE WAS NO MENTION AS TO WHETHER A PARTIAL SLURRY WALL OR SOME OTHER REMEDIATION WAS ANALYZED IN THE MODEL. IT APPEARS THAT JUST GROUNDWATER REMOVAL WAS TAKEN INTO ACCOUNT.

3) THERE ARE THE OTHER ALTERNATIVES TO HAVING 24 WELLS AROUND THE SITE PUMPING FOR 10 YEARS. WAS AN ANALYSIS PROVIDED WITH OTHER SCENARIOS, I.E. 8 WELLS PUMPING FOR 30 YEARS?

4) PERHAPS NO GROUNDWATER PUMPING WOULD BE NECESSARY AS THE LOCAL AQUIFER CONDITIONS MIGHT CHANGE ONCE THE SITE IS CAPPED. THE WATER TABLE UNDERNEATH THE LANDFILL MIGHT BE LOWER DUE TO LESS INFILTRATION OF LEACHATE, CREATING THE CONDITION THAT THE WASTES ARE NOT IN CONTACT DIRECTLY WITH THE GROUNDWATER.

IN CONCLUSION, HART RECOMMENDS THAT ADDITIONAL GROUNDWATER MODELING BE UNDERTAKEN. THE MODELING WOULD EXPLORE ALTERNATIVE REMEDIAL MEASURES AND COMBINATIONS OF VARIOUS REMEDIATIONS.

EVALUATION RESULTS: COST ITEM

THE COST OF ALTERNATIVE COMPONENTS AS PRESENTED IN THE FEASIBILITY STUDY WERE REVIEWED TO DETERMINE WHETHER THEY ARE CONSISTENT WITH HART'S EXPERIENCE WITH SIMILAR PROJECTS. THE REVIEW REVEALED INCONSISTENCIES WITH THE FEASIBILITY STUDY COSTS FOR THE MULTIMEDIA CAP AND FOR THE GROUNDWATER TREATMENT SYSTEM. THE COSTS ARE DISCUSSED AS FOLLOWS:

GROUNDWATER TREATMENT COSTS. CAPITAL AND ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS ARE PRESENTED IN APPENDIX C OF THE FEASIBILITY STUDY FOR THE TWELVE ALTERNATIVES CONSIDERED IN THE REPORT. ANNUAL O&M COSTS FOR GROUNDWATER PUMPING AND TREATMENT CAN BE DETERMINED BY COMPARING O&M COSTS FOR ALTERNATIVE 4 AND ALTERNATIVE 8. ALTERNATIVE 8 BY DEFINITION COMPRISES THE SAME REMEDIAL ACTIONS CONTAINED IN ALTERNATIVE 4 WITH THE ADDITION OF GROUNDWATER PUMPING AND TREATMENT. THE DIFFERENCE IN ANNUAL O&M COSTS BETWEEN ALTERNATIVE 8 AND ALTERNATIVE 4 REPRESENTS THE O&M COSTS FOR GROUNDWATER PUMPING AND TREATMENT:

ANNUAL O&M COST ALTERNATIVE NO. 8 = $601,000
ANNUAL O&M COST ALTERNATIVE NO. 4 = 107,000

ANNUAL O&M COST OF GROUNDWATER PUMPING & TREATMENT = $494,000.

THE ANNUAL O&M COST OF GROUNDWATER PUMPING (180 GPM) WAS ESTIMATED TO BE $8,500 USING USEPA COST CURVES (EPA - 430/9-78-009) AND A FIVE PERCENT YEARLY INFLATION RATE. THE ANNUAL O&M COST GIVEN IN THE FEASIBILITY STUDY FOR GROUNDWATER TREATMENT ALONE, THEN IS $485,500 ($494,000-$8,500).

OTHER SOLID WASTE FACILITIES HAVE PROVIDED HART WITH ACTUAL UNIT O&M COSTS FOR THE TREATMENT OF LEACHATE. UNIT O&M COSTS FOR COMPLETE ONSITE GROUNDWATER TREATMENT FOLLOWING THE AIR STRIPPER WERE REPORTED TO BE $0.045/GALLON. THIS IS OPTION 1 IN THE FEASIBILITY STUDY WHICH INCLUDES ACTIVATED SLUDGE, CLARIFICATION, SAND FILTRATION AND CARBON ABSORPTION. UNIT O&M COSTS REPORTED BY HART FOR PRETREATMENT OF GROUNDWATER AND

FOR MUNICIPAL WASTEWATER TREATMENT PLANT USER CHARGES ARE:

ON-SITE GROUNDWATER PRETREATMENT UNIT O&M COST = $0.034/GALLON
MUNICIPAL WASTEWATER TREATMENT PLANT USER CHARGES = 0.010/GALLON
(HART) TOTAL UNIT O&M CHARGE (OPTION 1) = $0.044/GALLON.

THE O&M COST TO TREAT THE 259,000 GPD PROJECTED GROUNDWATER FLOW FOR THE GEMS LANDFILL USING FEASIBILITY STUDY COSTS AND COSTS FROM SIMILAR HART PROJECTS ARE AS FOLLOWS:

OPTION		HART COSTS		FEASIBILITY STUDY	
NO.	DESCRIPTION	UNIT ([])	TOTAL ($ X 1,000)	UNIT ([])	TOTAL ($ X 1,000)
1	PRETREATMENT AND GTMUA DISCHARGE	$0.044	$4,160	(1)	(1)
2	COMPLETE ON-SITE TREATMENT	$0.045	$4,260	$0.005	$485

(1) COSTS NOT GIVEN IN FEASIBILITY STUDY FOR OPTION NO. 1.

PRESENT WORTH VALUES (30 YEARS, 10% INTEREST) OF HART AND FEASIBILITY STUDY COSTS ARE:

HART PRESENT WORTH O&M COST (OPTION 1) = $39,200,000
HART PRESENT WORTH O&M COST (OPTION 2) = $40,160,000
FEASIBILITY STUDY PRESENT WORTH O&M COST (OPTION 2) = $4,570,000.

IF COSTS FOR THE GEMS LANDFILL CLEANUP ARE CLOSER TO THE COSTS ESTIMATED BY HART THAN THEY ARE TO THE FEASIBILITY STUDY COSTS, THEN ATTENTION SHOULD BE PAID TO MEASURES WHICH COULD SIGNIFICANTLY DECREASE THE AMOUNT OF GROUNDWATER PUMPED AND TREATED UNDER THE LONG TERM REMEDIATION MEASURE. OTHER GROUNDWATER REMEDIATION MEASURES REFERRED TO IN THE EVALUATION OF THE REMEDIAL INVESTIGATION (PREVIOUS SECTION) BECOME AN INCREASINGLY IMPORTANT ITEM OF STUDY BECAUSE OF THE POTENTIAL TO DECREASE CONTAMINATED GROUNDWATER VOLUMES PUMPED TO TREATMENT AND THEREBY DECREASE THE APPARENTLY SIGNIFICANT ANNUAL O&M COST.

MULTIMEDIA CAP COSTS. THE DISCUSSION OF THE TECHNICAL PROBLEMS ASSOCIATED WITH THE MULTIMEDIA CAP OUTLINED AN $11 MILLION DOLLAR COST DIFFERENTIAL BETWEEN THE ALTERNATIVE 4 MULTIMEDIA CAP AND THE ALTERNATIVE 3 SOIL CAP. THE DIFFERENCE IN COST WAS MAINLY DUE TO FILTER FABRIC, SYNTHETIC MEMBRANE, SOIL, CLAY AND GRAVEL. HART QUESTIONS THE UNIT COSTS AND ITEM QUANTITIES FOR SOME OF THE COMPONENTS. FOR EXAMPLE, REVEGETATION COSTS FOR THE MULTIMEDIA CAP ARE LISTED IN APPENDIX C OF THE FEASIBILITY STUDY AS APPROXIMATELY $3,000 AN ACRE (INCLUDING OVERHEAD), WHEREAS RECENT HART PROJECTS HAVE REPORTED CONTRACTORS' BID COSTS FOR REVEGETATION CLOSER TO $1,000 AN ACRE. THERE ALSO SEEMS TO BE SOME INCONSISTENCIES IN THE ITEM QUANTITIES USED TO ESTIMATE THE COST OF EACH CAP TYPE. FOR EXAMPLE, THE QUANTITY NEEDED TO CONSTRUCT THE 24" SOIL AND TOPSOIL LAYER IN THE MULTIMEDIA CAP IS GIVEN IN APPENDIX C OF THE FEASIBILITY STUDY AS 470,000 CUBIC YARDS; THE COST IS GIVEN AS APPROXIMATELY 4 MILLION DOLLARS. ON THE OTHER HAND, THE QUANTITY OF SOIL AND TOPSOIL NEEDED FOR THE ALTERNATIVE 3 SOIL CAP (A 36" LAYER) IS LISTED AS 312,000 CUBIC YARDS FOR A COST OF ABOUT 2.5 MILLION DOLLARS.

THE AREA TO BE COVERED IS THE SAME FOR BOTH ALTERNATIVES AND THE REASON FOR THE DISCREPANCY (I.E. ALTERNATIVE 3 QUANTITIES AND COSTS FOR SOIL AND TOPSOIL SHOULD BE GREATER THAN ALTERNATIVE 4 QUANTITIES AND COSTS) IS NOT APPARENT FROM THE INFORMATION GIVEN IN THE FEASIBILITY STUDY. BECAUSE OF THE IMPORTANCE OF THE CAP IN THE SUCCESS OF THE PROJECT AND BECAUSE OF THE MAGNITUDE OF THE COSTS ASSOCIATED WITH CAPPING, HART RECOMMENDS THAT A SEPARATE COST STUDY BE CONDUCTED TO MORE ACCURATELY DEFINE ITEM QUANTITIES AND COSTS FOR THE MULTIMEDIA AND SOIL CAPS.

ATTACHMENT A

LETTER

TO: MR. ED PUTNAM, PROJECT MANAGER
GEMS LANDFILL SITE
NEW JERSEY REMEDIAL ACTION BRANCH
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION II

FROM: BENJAMIN G. STONELAKE, ESQ

FOR: TOWNSHIP OF GLOUCESTER
CAMDEN COUNTY, NJ

DATE: MAY 20, 1985

RE: COMMENTS ON DRAFT FOCUSED FEASIBILITY STUDY (FFS) FOR THE GEMS LANDFILL SITE.

BLANK, ROME, COMISKY AND MCCAULEY

MAY 20, 1985

MR. ED PUTNAM, PROJECT MANAGER
GEMS LANDFILL SITE
NEW JERSEY REMEDIAL ACTION BRANCH
U. S. ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 FEDERAL PLAZA
NEW YORK, N. Y. 10007

RE: COMMENTS ON DRAFT FOCUSED FEASIBILITY STUDY (FFS) FOR THE GEMS LANDFILL SITE

DEAR MR. PUTNAM:

ON BEHALF OF THE TOWNSHIP OF GLOUCESTER, WE ARE HEREBY SUBMITTING THE FOLLOWING COMMENTS AND OBJECTIONS TO THE DRAFT FOCUSED FEASIBILITY STUDY (FFS) FOR THE GEMS LANDFILL SITE. INITIALLY, I WISH TO CONFIRM OUR CONVERSATION IMMEDIATELY PRIOR TO EPA'S PUBLIC MEETING ON THE DRAFT FFS ON MAY 2, 1985. DURING THAT CONVERSATION, I OBJECTED TO THE EXTREMELY SHORT NOTICE THAT EPA GAVE TO THE TOWNSHIP AND THE APPARENT INADEQUACY OF THE NOTICE, GIVEN THE FACT THAT VERY FEW RESIDENTS FROM THE COMMUNITY WERE IN ATTENDANCE. I ALSO REGISTERED OUR VERY GRAVE CONCERN THAT EPA, CONTRARY TO EXISTING AGENCY POLICY, HAD REFUSED TO PERMIT THE TOWNSHIP TO PARTICIPATE IN THE FFS PROCESS AND THAT EPA, CONTRARY TO AN EARLIER COMMITMENT TO U.S. DISTRICT COURT JUDGE STANLEY BROTMAN, HAS FAILED TO CONDUCT A SEARCH FOR GENERATORS OF WASTE DISPOSED AT THE GEMS LANDFILL WHO WOULD BE RESPONSIBLE FOR PAYMENT OF THE COSTS OF INVESTIGATION AND CLEANUP. DURING THAT CONVERSATION, I ALSO OBJECTED TO THE LIMITED PUBLIC COMMENT THAT EPA ESTABLISHED STATING THAT INTERESTED PARTIES SHOULD BE ABLE TO SUBMIT COMMENTS BEYOND THE MAY 17, 1985 DATE, WHICH EPA ESTABLISHED FOR CLOSING THE COMMENT PERIOD ON THE DRAFT FFS. IN RESPONSE TO MY LATTER COMMENT, YOU STATED THAT THE TOWNSHIP COULD HAVE AN ADDITIONAL FEW DAYS TO SUBMIT COMMENTS BUT THAT EPA WISHED TO CLOSE THE PUBLIC COMMENT PERIOD AS QUICKLY AS POSSIBLE. WITHOUT WAIVING THE TOWNSHIP'S RIGHT TO CONTEST THE ADEQUACY OF EPA PAST PROCEDURES AND ACTIVITIES, INCLUDING THE EPA'S REFUSAL TO PERMIT THE TOWNSHIP TO PARTICIPATE IN THE FFS PROCESS AND THE INORDINATELY SHORT COMMENT PERIOD ON THE DRAFT FFS, WE SUBMIT THE FOLLOWING LIMITED COMMENTS AND OBJECTIONS TO THE ACTIVITIES PROPOSED IN THE DRAFT FFS. WE SPECIFICALLY RESERVE THE RIGHT TO RAISE THESE OBJECTIONS AND ADDITIONAL OBJECTIONS IN ANY PROCEEDING BY EPA FOR REIMBURSEMENT OF RESPONSE COSTS OR ANY OTHER EPA ACTION OR PROCEEDING PERTAINING TO THE GEMS LANDFILL.

TO DATE, EPA HAS NOT PUBLISHED, CITED OR OTHERWISE RELEASED ANY ENVIRONMENTAL DATA THAT JUSTIFIES THE IMPLEMENTATION OF THE INTERIM REMEDIAL MEASURES RECOMMENDED IN THE DRAFT FFS. MORE SPECIFICALLY, NEITHER THE

DRAFT FFS NOR ANY OTHER EPA DOCUMENTS PRESENTED TO THE TOWNSHIP STATES THAT THE PROPOSED INTERIM REMEDIAL ACTIONS ARE NECESSARY TO: (I) PREVENT, LIMIT OR MITIGATE AN EMERGENCY; (II) PREVENT AN IMMEDIATE RISK TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT; AND (III) THAT SUCH ACTIONS WILL NOT OTHERWISE BE PROVIDED ON A TIMELY BASIS. SECTION 104(C)(1) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA) PROHIBITS EPA FROM IMPLEMENTING THE DRAFT FFS UNLESS EPA CAN SATISFY ALL THREE OF THE FOREGOING CRITERIA. OTHERWISE, EPA MUST AWAIT COMPLETION OF THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) THAT IS CURRENTLY IN PROGRESS, AND SATISFY ALL OTHER REQUIREMENTS OF SECTION 104 OF CERCLA AND THE NATIONAL CONTINGENCY PLAN (NCP) PRIOR TO IMPLEMENTING THE MEASURES PROPOSED IN THE DRAFT FFS.

ASSUMING THAT EPA PROCEEDS TO IMPLEMENT THE DRAFT FFS CONTRARY TO SECTION 104(C)(1) OF CERCLA, AND WITHOUT WAIVING THE TOWNSHIP'S RIGHT TO CONTEST SUCH ACTION NOW OR IN THE FUTURE, THE TOWNSHIP SUBMITS THE FOLLOWING ADDITIONAL COMMENTS. SINCE EPA PREDICTS THAT THE RI/FS WILL BE COMPLETED IN JULY OR AUGUST, 1985, WE BELIEVE THAT THE PROPOSED STREAM DIVERSION AND GROUNDWATER TREATMENT PROGRAMS SHOULD NOT BE IMPLEMENTED UNTIL IT CAN BE DETERMINED WHETHER SUCH PROGRAMS WILL BE CONSISTENT WITH THE FINAL REMEDY PROPOSED BY THE RI/FS. WE FEEL IT IS PARTICULARLY IMPORTANT TO NOTE HERE THAT IN RESPONSE TO ONE OF MY QUESTIONS AT THE PUBLIC MEETING ON MAY 2, 1985, MR. JOHN FRISCO, CHIEF, NEW JERSEY REMEDIAL ACTION BRANCH, US EPA, REGION II, SAID THAT HE COULD NOT NOW STATE THAT THE INTERIM REMEDY PROPOSED IN THE DRAFT FFS WOULD BE CONSISTENT WITH THE FINAL REMEDY THAT WILL BE PROPOSED IN THE RI/FS. GIVEN THIS UNCERTAINTY, WE FEEL IT IS INAPPROPRIATE TO SPEND SEVERAL MILLION DOLLARS ON AN INTERIM REMEDY THAT MIGHT BE INCONSISTENT WITH THE FINAL REMEDY WHICH WILL BE PROPOSED IN APPROXIMATELY THREE MONTHS AT THE CONCLUSION OF AN RI/FS ON WHICH EPA IS SPENDING MORE THAN $1,000,000 TO PREPARE AND COMPLETE.

ADDITIONALLY, WE HAVE BEEN ADVISED THAT THE PRINCIPAL REASON WHY EPA AND NJ DEP INTEND TO IMPLEMENT THE DRAFT FFS IS BECAUSE OF AN "INFERRED AIR POLLUTION PROBLEM" IN THE VICINITY OF THE LANDFILL. IN ALL CANDOR, DEP REPRESENTATIVES TOLD TOWNSHIP RESIDENTS DURING A PUBLIC MEETING ON APRIL 11, 1985 THAT IT HAD CONDUCTED EXTENSIVE AIR QUALITY MONITORING IN THE RESIDENTIAL NEIGHBORHOOD ADJACENT TO THE LANDFILL AND THAT IT HAD NOT BEEN ABLE TO DOCUMENT ANY SIGNIFICANT AIR CONTAMINATION THAT COULD BE ATTRIBUTED TO THE LANDFILL. DURING THAT MEETING, REPRESENTATIVES OF DEP AND THE NEW JERSEY DEPARTMENT OF HEALTH ALSO TOLD THE RESIDENTS THAT THE LEVEL OF AIR CONTAMINANTS DETECTED IN THE NEIGHBORHOOD WERE COMPARABLE TO THE LEVEL OF AIR CONTAMINANTS FOUND AT OTHER LOCATIONS THROUGHOUT THE STATE AND THAT, THEREFORE, THE LIMITED AIR CONTAMINATION OBSERVED IN THE NEIGHBORHOOD COULD NOT BE ATTRIBUTED TO THE GEMS LANDFILL. WE ACKNOWLEDGE THAT DEP ALSO REPORTED AT THE PUBLIC MEETING ON APRIL 11 THAT IT HAD RECEIVED NUMEROUS REPORTS OF NOSEBLEEDS AND THAT DEP BELIEVED THAT THESE REPORTS WERE CONCENTRATED IN A VERY SMALL AREA IN A NEIGHBORHOOD ADJACENT TO THE LANDFILL. FOR THIS REASON, DEP REPRESENTATIVES SAID THEY INFERRED THAT SUCH PROBLEM WAS CAUSED BY CONTAMINATION FROM THE LANDFILL, DESPITE THE FACT THAT DEP'S AIR QUALITY SURVEY DID NOT DETECT ANY SIGNIFICANT AIR CONTAMINATION THAT COULD BE ATTRIBUTED TO THE LANDFILL.

ASSUMING, WITHOUT ACKNOWLEDGING, THAT THESE NOSEBLEEDS COULD BE ATTRIBUTED TO THE LANDFILL, THEY MAY NOT BE ATTRIBUTABLE TO ANY NON-METHANE HYDROCARBONS. SINCE THE REMEDIES PROPOSED FOR THE DRAFT FFS ARE INTENDED TO ADDRESS NON-METHANE HYDROCARBONS THAT ARE ALLEGEDLY DISSOLVED IN THE GROUNDWATER REGIME, WE SUSPECT THAT THE REMEDY PROPOSED IN THE DRAFT FFS WOULD NOT MITIGATE THE ALLEGED NOSEBLEED PROBLEM. WE UNDERSTAND THAT DEP HAS CONDUCTED TESTS TO ASSESS METHANE GAS MIGRATION FROM THE LANDFILL AND THAT DEP HAS REPORTED THAT IT HAS FOUND EVIDENCE OF SUCH MIGRATION. ACCORDINGLY, WE WOULD RECOMMEND THAT EPA INVESTIGATE THE POSSIBLE NEED FOR A PASSIVE OR ACTIVE METHANE GAS RECOVERY SYSTEM AT THE LANDFILL.

FINALLY, WE QUESTION THE NEED TO INSTALL A CARBON ADSORPTION SYSTEM TO TREAT THE OFF-GASES FROM THE PROPOSED AERATION STRIPPING TOWERS. IF WE ACCEPT AS ACCURATE THE REPORTED CONCENTRATIONS OF VOLATILE ORGANIC COMPOUNDS (VOCS) REPORTED IN TABLE 1-1 OF THE DRAFT FFS, AND WE ASSUME THAT THE RELATIVE CONCENTRATIONS OF THESE COMPOUNDS WILL REMAIN CONSTANT IN ALL OF THE LEACHATE PUMPED FROM THE PROPOSED RECOVERY WELLS, WE ESTIMATE THAT THE AVERAGE DENSITY OF THE CONTAMINANTS WOULD BE 8.72 POUNDS PER GALLON OF CONTAMINANTS THAT WILL BE REMOVED FROM THE AERATION STRIPPING TOWERS. ASSUMING, ALSO, THAT THE DRAFT FFS ACCURATELY PREDICTS THAT IT WILL BE NECESSARY TO PUMP AND TREAT 86,000 GALLONS PER DAY (GPD) OF GROUNDWATER THAT IS CONTAMINATED WITH LEACHATE AT MAXIMUM, AVERAGE AND MINIMUM VOC CONCENTRATIONS OF 32 PPM, 11 PPM, AND 2 PPM, RESPECTIVELY, AND ALSO ASSUMING THAT THE PROPOSED STRIPPERS REMOVE ALL VOCS FROM THE GROUNDWATER, WE ESTIMATE THAT THE MAXIMUM, AVERAGE AND MINIMUM VOLUMES OF VOC'S REMOVED WILL BE 2.75 GPD, 0.946 GPD, AND 0.17 GPD, RESPECTIVELY. MULTIPLYING THE WEIGHTED-AVERAGE DENSITY REFERENCED ABOVE TIMES THESE VOLUMETRIC ESTIMATES, WE CONCLUDE THAT, IF EPA AND DEP'S ENVIRONMENTAL DATA AND PROJECTIONS ARE CORRECT, THE COMBINED MAXIMUM, AVERAGE

AND MINIMUM VOC EMISSIONS FROM BOTH AERATION STRIPPING TOWERS WOULD BE APPROXIMATELY 23.98 LBS PER DAY, 8.25 LBS PER DAY AND 1.48 LBS PER DAY, RESPECTIVELY. THESE VOC EMISSIONS WOULD NOT WARRANT THE INSTALLATION OF A CARBON ADSORPTION SYSTEM TO TREAT AIR POLLUTION EMISSIONS FROM THE STRIPPERS. ASSUMING, WITHOUT ADMITTING, THAT EPA AND DEP'S PROJECTIONS ARE CORRECT, WE CONCLUDE THAT THE COMBINED VOC AVERAGE EMISSIONS FROM BOTH TOWERS WOULD BE ROUGHLY EQUIVALENT TO THE VOC EMISSIONS FROM A COIN-OPERATED, COMMERCIAL DRY CLEANING SHOP AND THAT SUCH EMISSIONS WOULD DISPERSE RAPIDLY WHEN THEY WERE EMITTED FROM THE TOP OF THE STRIPPING TOWERS.

FOR THE ABOVE REASONS, WE OBJECT TO THE DRAFT FFS AND WE URGE EPA TO EXPEDITE THE COMPLETION OF THE RI/FS BEFORE IT DECIDES WHETHER TO IMPLEMENT THE REMEDIES PROPOSED IN THE DRAFT FFS. IF THE RI/FS REASONABLY CONCLUDES THAT SOME OR ALL OF THE REMEDIES PROPOSED IN THE DRAFT FFS ARE APPROPRIATE, WE MAY AGREE THAT SUCH REMEDIES SHOULD BE IMPLEMENTED AS SOON AS POSSIBLE AFTER COMPLETION OF THE RI/FS.

SINCERELY YOURS,

BENJAMIN G. STONELAKE, JR

CC: MAYOR ANN MULLEN
NICHOLAS TRABOSH, ESQUIRE
CHARLES G. PALUMBO, ESQUIRE
DR. JORGE BERKOWITZ
MARTY JUDGE, ESQUIRE
MR. DAVID HENDERSON
MR. JOHN FRISCO.

TABLE A
GEMS LANDFILL
PATHWAYS OF MIGRATION AND POTENTIAL HAZARDS

AIR CONTAMINATION

- VOLATILIZATION OF ORGANIC CHEMICALS FROM CONTAMINATED SURFACE WATER AND LEACHATE SEEPS
- UNCONTROLLED DISCHARGE OF LANDFILL GASES CONTAINING ORGANIC CHEMICALS

GROUND WATER CONTAMINATION

- CONTAMINANT PLUME IN COHANSEY/KIRKWOOD AQUIFER MIGRATING OFF-SITE
- CONTAMINATED GROUND WATER DISCHARGING TO HOLLY RUN
- WASTE IN CONTACT WITH GROUND WATER
- POTENTIAL FOR RESIDENTIAL WELL CONTAMINATION

SURFACE WATER CONTAMINATION

- HOLLY RUN AND BRIAR LAKE WATER AND SEDIMENT CONTAMINATION
- POTENTIAL FOR CONTAMINANT MIGRATION DOWNSTREAM OF BRIAR LAKE

LEACHATE

- PERCOLATION INTO GROUND WATER
- SURFACE SEEPS

PHYSICAL HAZARDS

- LANDFILL GASES POTENTIALLY CREATING ON AND OFF-SITE EXPLOSIVE SITUATIONS
- EXPOSED WASTE.

TABLE B
GEMS SITE, REMEDIAL ACTION ALTERNATIVES
CAPITAL AND O&M COSTS

REMEDIAL ACTION ALTERNATIVE	CAPITAL ($1,000)	ANNUAL O&M ($1,000)
1. NO ACTION	$ 0	0
2. NO ACTION WITH MONITORING	0	53
3. SOIL CAP WITH PARTIAL LANDFILL EXCAVATION *	11,209	107
4. SOIL/MULTIMEDIA CAP WITH PARTIAL LANDFILL EXCAVATION *	22,635	107
5. SOIL CAP WITH NO LANDFILL EXCAVATION *	22,952	107
6. SOIL CAP WITH LANDFILL EXCAVATION ONLY ON THE SOUTHERN SLOPE *	18,776	107
7. SOIL CAP WITH PARTIAL LANDFILL EXCAVATION AND GROUND WATER EXTRACTION AND TREATMENT *	12,502	601
8. SOIL/MULTIMEDIA CAP WITH PARTIAL EXCAVATION AND GROUND WATER EXTRACTION AND TREATMENT *	23,928	601
8-MODIFIED. CLAY/MULTIMEDIA CAP WITH PARTIAL EXCAVATION AND GROUND WATER EXTRACTION AND TREATMENT *	27,365	601
9. SOIL CAP WITH NO LANDFILL EXCAVATION WITH GROUND WATER EXTRACTION AND TREATMENT *	24,245	601
10. SOIL CAP WITH LANDFILL EXCAVATION ONLY ON THE SOUTHERN SLOPE WITH GROUND WATER EXTRACTION AND TREATMENT *	20,069	601
11. ON-SITE RCRA LANDFILL WITH GROUND WATER TREATMENT, HOLLY RUN AND BRIAR LAKE REMEDIATION, ACTIVE GAS COLLECTION AND TREATMENT	162,946	606
12. OFF-SITE DISPOSAL WITH GROUND WATER TREATMENT, HOLLY RUN AND BRIAR LAKE REMEDIATION	1,500,000	

NOTE: ANNUAL O&M COSTS INCLUDE MONITORING AND POST CLOSURE MAINTENANCE

* THESE OPTIONS ALSO INCLUDE, CAP FOUNDATION WITH TOE DRAIN, ACTIVE GAS COLLECTION AND TREATMENT, HOLLY RUN AND BRIAR LAKE REMEDIATION, SURFACE WATER DIVERSION AND SECURITY FENCE.

TABLE C
REMEDIAL ACTION ALTERNATIVES
PRESENT WORTH COSTS
GEMS SITE

REMEDIAL ACTION ALTERNATIVE	PRESENT-WORTH * ($1,000)
1. NO ACTION	$ 0
2. NO ACTION WITH MONITORING	498
3. SOIL CAP WITH PARTIAL LANDFILL EXCAVATION (3 YRS) **	11,227
4. SOIL/MULTIMEDIA CAP WITH PARTIAL LANDFILL EXCAVATION (3 YRS) **	21,664
5. SOIL CAP WITH NO LANDFILL EXCAVATION (4 YRS) **	21,011
6. SOIL CAP WITH LANDFILL EXCAVATION ONLY ON THE SOUTHERN SLOPE (3 YRS) **	18,124
7. SOIL CAP WITH PARTIAL LANDFILL EXCAVATION AND GROUND WATER EXTRACTION AND TREATMENT (3 YRS) **	16,772
8. SOIL/MULTIMEDIA CAP WITH PARTIAL EXCAVATION WITH GROUND WATER EXTRACTION AND TREATMENT (3 YRS) **	28,148
8-MODIFIED. CLAY/MULTIMEDIA CAP WITH PARTIAL EXCAVATION AND GROUND WATER EXTRACTION AND TREATMENT (3 YRS) **	31,000
9. SOIL CAP WITH NO LANDFILL EXCAVATION WITH GROUND WATER EXTRACTION AND TREATMENT (4 YRS) **	26,961
10. SOIL CAP WITH LANDFILL EXCAVATION ONLY ON THE SOUTHERN SLOPE WITH GROUND WATER EXTRACTION AND TREATMENT (3 YRS) **	24,257
11. ON-SITE RCRA LANDFILL WITH GROUND WATER TREATMENT	133,048
12. OFF-SITE DISPOSAL WITH GROUND WATER TREATMENT	1,600,000

* THESE COSTS REFLECT CAPITAL COST DISTRIBUTION OVER THE CONSTRUCTION DURATION OF THE RESPECTIVE ALTERNATIVES;

(- YRS) = ESTIMATED CONSTRUCTION DURATION IN YEARS

** THESE OPTIONS ALSO INCLUDE, CAP FOUNDATION WITH TOE DRAIN, ACTIVE GAS COLLECTION AND TREATMENT, HOLLY RUN AND BRIAR LAKE REMEDIATION, SURFACE WATER DIVERSION AND SECURITY FENCE.